

University of Warwick institutional repository: <http://go.warwick.ac.uk/wrap>

**A Thesis Submitted for the Degree of DClínPsych at the University of Warwick**

<http://go.warwick.ac.uk/wrap/2900>

This thesis is made available online and is protected by original copyright.

Please scroll down to view the document itself.

Please refer to the repository record for this item for information to help you to cite it. Our policy information is available from the repository home page.

# **The Measurement of Impulsivity**

**Emily Miller**

A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of  
Clinical Psychology.

Coventry University, School of Health and Social Sciences and University of Warwick,  
Department of Psychology.

May 2003

## **Contents**

Acknowledgements	7
Declaration	8
Summary	10

## **Chapter I - Literature Review**

Title	11
Abstract	12
<b>Introduction</b>	<b>13</b>
<b>The historical development of the impulsivity construct</b>	<b>14</b>
<b>Personality theories that incorporate impulsivity</b>	<b>15</b>
<b>General theories of impulsivity</b>	<b>19</b>
<b>Measurement of impulsivity</b>	<b>23</b>
Strengths and weaknesses of different measurement approaches	25
Personality measures of impulsivity	25
Behavioural measures of impulsivity	30
Cognitive measures of impulsivity	31
<b>Factor analytic studies of impulsivity</b>	<b>33</b>
<b>Conclusions</b>	<b>36</b>
Research implications and future directions	36
Do we have a reliable way of measuring impulsivity?	37
<b>References</b>	<b>39</b>

## **Chapter II - Main paper**

Title	49
Abstract	50
<b>Introduction</b>	<b>51</b>
<b>Method</b>	<b>56</b>
Participants	56
Measures	57
Dickman Impulsiveness Inventory	57
Adult Impulsiveness Scale	58
BIS / BAS Scales	58
Barratt Impulsiveness Scale	59
Procedure	60
<b>Results</b>	<b>60</b>
Internal consistency	60
Relationship among impulsivity scales	61
Principal Components Analysis	61
<b>Discussion</b>	<b>63</b>
<b>References</b>	<b>67</b>

## **Chapter III - Brief paper**

Title	73
Abstract	74
<b>Introduction</b>	<b>75</b>
The Attentional Fixity Theory	75
Arousal	76
Types of impulsivity	77

Main findings of study	78
Current study	78
Design	79
Impulsivity	79
Arousal	79
Visual Search Task	80
<b>Method</b>	<b>80</b>
Participants	80
Measures	81
Dickman Impulsiveness Inventory	81
Visual Search Task	81
Galvanic Skin Response	83
Procedure	83
<b>Results</b>	<b>85</b>
Reaction times	85
Error rate	87
Impulsivity	88
Arousal	89
<b>Discussion</b>	<b>90</b>
Study limitations and future research directions	93
Conclusions	94
<b>References</b>	<b>96</b>
 <b><u>Chapter IV - Reflective paper</u></b>	
Title	100
Abstract	101

Ethical issues in research with mentally disordered offenders	102
Rethinking the utility of self-report assessment tools	105
Further reflections on the concept of impulsivity	107
Conclusions	110
References	111

## **Appendices**

<b>Appendix A</b>	Northampton Primary Care Trust ethics approval letter	114
<b>Appendix B</b>	Notes for authors	116
	- Personality and Individual Differences	117
	- Journal of Personality Assessment	119
	- Journal of Interpersonal Violence	121
<b>Appendix C</b>	Questionnaire booklets	122
	- Cover Information sheet	123
	- Demographic Questionnaire	124
	- Dickman Impulsiveness Inventory	125
	- Barratt Impulsiveness Scale	127
	- Adult Impulsiveness Scale	128
	- BIS/BAS Scales	130
<b>Appendix D</b>	Scree Plot (Chapter II)	131
<b>Appendix E</b>	Human body images (Chapter III)	132
<b>Appendix F</b>	Raw data (Chapter III)	134
<b>Appendix G</b>	Galvanic Skin Response record form (Chapter III)	136
<b>Appendix H</b>	Consent form (Chapter III)	137

## List of Illustrations

### Tables

#### **Chapter I - Literature Review**

Table 1 - A summary of personality theories of impulsivity	18
Table 2 - A summary of impulsivity measures	24
Table 3 - A review of factor analytic studies of impulsivity measures	34

#### **Chapter II - Main Paper**

Table 1 - Internal reliability coefficients, mean scores and standard deviations for impulsivity measure subscales	60
Table 2 - Correlation matrix for 10 impulsivity subscales	61
Table 3 - Component loadings from the Principal Components Analysis of each of the impulsivity measure subscales	62

#### **Chapter III - Brief Paper**

Table 1 - Raw reaction times	85
Table 2 - Summary of impulsivity scores, reaction times, error and GSR scores for all participants	88

### Figures

#### **Chapter III - Brief Paper**

Figure 1 - Mean reaction times for block and display size - Absent targets	86
Figure 2 - Mean reaction times for block and display size - Present targets	87
Figure 3 - Interaction of error, reaction time and galvanic skin response	89



## Acknowledgements

In preparing this thesis, I am indebted to Jeremy Tudway, my academic and clinical supervisor, who has provided expertise, support, and enthusiasm throughout the course of this research project.

I would also like to thank Derrick Watson, who has baffled my brains with all things technical, in providing the methodology for the brief paper. Thanks also to Stephen Joseph, for his statistical guidance and achieving the remarkable feat of making me enthusiastic about factor analysis.

Huge thanks to my family and friends for being a constant source of encouragement and for distributing questionnaires to anyone who would fill one in. Thank you also to all those who took time to put pen to paper.

And finally to one psychiatric hospital, who saved the day, so late in the day, and provided access to participants, and to the seven men who gave up their time to help; A most heart felt thank you.



## Declaration

The work contained in this thesis was carried out under the sole supervision of Dr Jeremy Tudway. Dr Derrick Watson contributed greatly to the brief paper, providing technical methodology and statistical advice. Design and production of the main paper was carried out in collaboration with Dr Stephen Joseph.

Aside from these collaborations, all the material presented within this thesis is the candidate's own work. Authorship of any papers arising from this thesis, will be shared with the above named individuals. This thesis has not been submitted for a degree at any other university.

Ethical approval for the data collection in Chapter III was provided by Northampton Primary Care Trust (see Appendix a)

Chapter two has been submitted for publication in *Personality and Individual Differences*. Chapters one and three are to be submitted to the *Journal of Personality Assessment* and *Journal of Interpersonal Violence*, respectively (See Notes for Authors in Appendix b). Provisional authorship for these papers are as follows;

Miller, E., Joseph, S., & Tudway, J. (2003). Impulsivity: Assessing the Component Structure of four Self-Report Measures. Submitted to *Personality and Individual Differences*.

Miller, E. & Tudway, J. (2003). Deconstructing impulsivity and its measurement:  
A critical review. To be submitted to the *Journal of Personality Assessment*

Miller, E., Tudway, J., & Watson, D. (2003). Investigating the Attentional-Fixity  
theory of impulsivity (Dickman, 1993, 1996) among a UK sexual offending  
sample. To be submitted to the *Journal of Interpersonal Violence*.

## Summary

The focus of this thesis is the much debated construct of impulsivity, exploring its meaning, etiology and measurement.

The literature review provides a background for the empirical papers, by examining the theoretical underpinnings of impulsivity, from which a plethora of measuring instruments have been generated. The review explores the difficulties associated with measuring a construct which has little consensus over its components, and highlights studies which have attempted to draw together a common understanding of the construct.

The main paper provides a useful exploration of four widely used self-report measures of impulsivity, investigating whether the measures examine similar or different facets of impulsivity. The results demonstrate the lack of congruity between the measures, suggesting that two of the measures appear to tap a common construct, whereas the remaining two measure only a narrow construct and raise questions about its validity.

The brief paper is a pilot study drawing upon a visual search paradigm to investigate the Attentional Fixity theory of impulsivity, arousal and performance among a sexual offending sample. The findings although tentative, failed to support the hypothesis that arousal improves performance in a cognitive task. Instead it was found that performance decreased when individuals were presented with sexual stimuli. The findings also fail to support the hypothesis that high impulsivity is associated with an inability to fix attention on a source of input. This suggests that the current sample of sexual offenders, as a high impulsive group tend to fix their attention on sexual stimuli and become distracted from other cognitive demands.

Finally, the reflective review explores further findings from the empirical papers, reflecting upon methodological, ethical and conceptual issues.

## **Chapter I - Literature Review**

**Redefining impulsivity and its measurement: A critical review.**

## **Abstract**

The research literature on impulsivity lacks consensus due to disagreement as to its underpinning theoretical assumptions. Consequently, there is equal confusion in attempts to define and measure the construct.

The current paper critically reviews the development of theories of impulsivity, examining the commonalities and differences between them. The various types of assessment tools and measurement approaches are discussed, that have evolved from the different theoretical stances. The difficulties associated with measurement of impulsivity are then explored, with specific reference to factor analytic studies which have attempted to elicit a common understanding of the construct.



## 1. Introduction

Examination of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 2000) illustrates the broad nature of the impulsivity construct, in its *implied* role *in* numerous disorders, such as Bulimia Nervosa, personality disorders, impulse-control disorders, substance dependence and various paraphilias.

Criterion labels include a 'lack of control', 'a failure to resist urges', 'a failure to plan ahead', as well as 'impulsivity in potentially damaging ways', such as financial, sexual, consumption and reckless behaviour. The use of differing terminology to explain a supposedly single construct represented within a diverse range of disorders, not only creates confusion but limits the explanatory power of the construct.

In his critique of the five-factor theory of personality (Costa & McCrae, 1990), Block (1995) argues that understanding of impulsivity is hindered by the 'jingle-jangle' fallacies. According to Block, the 'jingle' fallacy refers to the problem of two or more impulsivity-related constructs, despite similar labels, actually measuring different things, hence their labels being a misnomer. Conversely, the 'jangle' fallacy highlights different labels being used that measure a similar construct.

This review aims to examine key theories of impulsivity along with their associated assessment tools. It is hoped that it will draw together similarities and differences between the theories, measures and constructs, clarifying questions relating to differences in the use of the term impulsivity. As such, the key questions appear to be: Whether despite differences in terminology, different

theorists are actually examining the same construct; and secondly, are they all fundamentally agreeing or disagreeing on the nature of impulsivity?

In order to answer these questions, this review assesses important theories and studies into impulsivity from past to present, highlighting whether we are better informed now as to what impulsivity is.

## **2. The historical development of the impulsivity construct**

The construct of impulsivity has a considerable history in psychological literature, with much debate focusing on whether it can be conceived as a negative stigma or a pathological trait.

Hippocrates (460-377 B.C.) provides one of the earliest formal theoretical models that introduced a fourfold topology of personality, whereby each type was associated with a body fluid. With the rise of orthodox Christianity in the 16<sup>th</sup> and 17<sup>th</sup> centuries, came the morally driven idea that impulsivity was driven by the work of the devil, causing an individual to lose their ability to exercise free will. The theoretical debate continued with the development of empirical philosophy, between impulsivity being viewed as a defect in character that should be morally condemned (Prichard, 1835) or those who noted impulsivity as a pathology process (Pinel, 1801).

Bonnet (1684) recognised that impulsivity can be composed of impulsive thoughts, impulsive character as well as unstable mood featuring impulsive behaviours. In addition, he also noted that impulsivity was likely to be represented in individuals such as criminals and inebriants. Kant (1724-1804) later introduced a scientific



approach to personality, through his reintroduction of a typological model, his work being further developed by Queyart (1896) who suggested that typologies could overlap. Abnormal features of personality, such as impulsivity, were seen as extremes of normal features, thereby supporting a dimensional view of personality.

As psychoanalytic theory rose to prominence, Freud (1931, 1960) introduced the idea that impulses were expressions that the conscious could not suppress, and that certain personality types have stronger impulses than others. It was not until the late 1940's that research into personality expanded, bringing with it, impulsivity theories that incorporated biological, social, cognitive and developmental influences (e.g. Barratt, 1959).

### **3. Personality theories that incorporate impulsivity**

#### *3.1 Eysenck (1952)*

Eysenck (1952) proposed a hierarchical, bio-social model of personality, developed from the historical influences of Hippocrates and Kant. At the highest level, this consisted of three broad dimensions or types; Extraversion, Neuroticism and Psychoticism. Eysenck believed that individual differences in the three major dimensions are primarily related to genetic factors, and tend to be stable throughout the lifespan.

Eysenck postulated that the broad dimensions are comprised from clusters of traits, impulsiveness identified as being a trait underlying Extraversion (Eysenck, 1967). Eysenck and Eysenck (1975) later redefined impulsivity into four key

clusters of behaviour or response; Narrow impulsiveness, risk taking, non-planning and liveliness. Correlational studies revealed that of the four dimensions, all correlated with Extraversion, apart from narrow impulsiveness, which showed high correlations with Psychoticism. Further theoretical changes then redefined impulsivity as consisting of two components; Impulsiveness and Venturesomeness (Eysenck & Zuckerman, 1978). Reviewing these changes, Eysenck (1993) noted a study by Corrello (1987), that in accordance with Eysenck & Zuckerman (1978), found that Impulsiveness aligned with Psychoticism, Extraversion and Neuroticism, whereas Venturesomeness correlated with only Extraversion.

### *3.2 Buss and Plomin (1975)*

Buss and Plomin (1975) developed an interactive theory, proposing that four inborn temperaments explain individual differences in personality; Emotionality, activity, sociability and impulsivity. The theory recognises that the four dimensions of personality interact to influence one another in a way that can induce or inhibit individuals to action.

Buss and Plomin (1975) define impulsivity as being a two-dimensional construct, which involves the ability to 'resist versus give in to urges, impulses, or motivational states', and secondly, 'responding immediately and impetuously to a stimulus versus lying back and planning before making a move' (p.8).

### *3.3 McCrae and Costa (1990)*

McCrae and Costas proposed a hierarchical, bio-social model of personality, incorporating five broad dimensions of personality, held to be a complete

description of personality. These higher level domains are Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism (OCEAN), proposed to be formed by the combination of lower level facets.

Costa and McCrae postulate that within their model, four different types of impulsivity exist, each measured by four facets on three different domains. Low self-control is captured by two facets, self-discipline and impulsiveness, underlying the Conscientiousness and Neuroticism domains respectively. Self-discipline refers to an individual's 'ability to remain focused on a task that may be boring or difficult'. Impulsiveness is described by the authors as a 'tendency to experience strong impulses, frequently under conditions of negative affect', thus opposing Barratt's (1993) argument that impulsiveness is orthogonal to neuroticism. A third facet of impulsivity within the model is Excitement, which underlies the Extraversion dimension. The deliberation facet of Conscientiousness is held to be similar to Barratt's (1993) Non-planning and Tellegen's (Tellegen, 1982) Control scale. The deliberation facet refers to an individual's ability to 'think and reflect on the consequences of an act before engaging in that act'.

### *3.4 Tellegen (1982)*

Tellegen introduced a hierarchical personality theory, which suggests that individuals differ in the manner and intensity in which they respond to emotional stimuli because of temperamental differences. His personality model incorporates three higher order factors: positive emotionality, negative emotionality and constraint, the former two factors relating heavily to mood states.



Impulsiveness is a component of the constraint dimension, suggested to reflect an individual's level of caution and propensity towards risky behaviour. Tellegen (1982) describes individuals low in constraint as 'relatively impulsive, adventurous and inclined to reject conventional restrictions on behaviour'.

### 3.5 Summary of personality theories of impulsivity

These are the some of the key contemporary personality theorists who place a significant emphasis on impulsivity in their model of personality. Others such as , Zuckerman and colleagues, incorporated an impulsive-sensation seeking component into their general theory of personality (Zuckerman, Kuhlman, Thornquist & Kiers, 1991). Table 1 summarises the main personality theories discussed in this review.

**Table 1.** A summary of personality theories of impulsivity.

<i>Buss &amp; Plomin (1975)</i>	Activity		Impulsivity	Emotionality	
<i>Costa &amp; McCrae (1990)</i>	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
<i>Eysenck (1952)</i>	Extraversion	Psychoticism		Neuroticism	
<i>Tellegen (1982)</i>	Positive Emotionality		Constraint	Negative Emotionality	Absorption
<i>Zuckerman et al. (1991)</i>	Extraversion		Psychoticism, Impulsivity, Sensation seeking	Neuroticism	Psychoticism Impulsivity, Sensation seeking

Adapted from Digman, 1997; Griffin & Bartholomew, 1994; John, 1990; McCrae & Costa, 1996.

The table illustrates the lack of agreement of the role and placement of impulsivity within personality constructs. Theorists differ in whether impulsivity is a key dimension within the personality (e.g., Buss & Plomin, 1975), or whether it underlies other personality dimensions (e.g. Costa & McCrae, 1990). It is noted that these are largely biological theories of personality and that most draw from

Eysenck's three personality dimensions. Differences between these theories seem to reflect semantics and loadings within each model.

This relates back to Block's (1995) 'jingle-jangle' argument concerning the impulsivity construct. Indeed, this is exemplified when Eysenck & Zuckerman's (1978) and Buss and Plomin's (1975) constructs of impulsivity are compared.

Whereas the former reflects impulsiveness and venturesomeness, the latter relates to a diverse range of impulsivity facets such as, Inhibitory control, Decision time, Persistence and Sensation seeking.

Block's 'jangle' concept is also demonstrable in the use of terminology. For instance, Costa and McCrae's Extraversion dimension is composed of facets, one of which is excitement. This excitement component is analogous to both Zuckerman's Sensation seeking and Eysenck's Venturesomeness scales.

#### **4. General theories of impulsivity**

##### *4.1 Barratt (1959)*

Barratt's work developed from learning theories proposing that anxiety measured 'habit strength' (Hull, 1943; Spence, 1956), and that impulsiveness was related to 'behavioural oscillation' in the same system (Taylor, 1958; Taylor & Spence, 1952).

Barratt considered that 'behavioural oscillation' (impulsiveness) and 'habit strength' (anxiety) were related to different neural systems (Barratt, 1994). This hypothesis was substantiated through testing of his Impulsiveness Scale (BIS) that identified a set of impulsiveness items as being factorially orthogonal to anxiety

items (Barratt, 1965, 1972), suggesting that impulsivity is independent of emotion (Barratt, 1993).

Barratt's comprehensive model of impulsivity integrates biological, cognitive, behavioural and social data (Barratt, 1993), viewing impulsivity as a first-order personality trait, closely linked to Eysenck's Extraversion, sensation seeking and hypomania (Barratt & Patton, 1983). Following Eysenck's realignment of impulsiveness with Psychoticism, the BIS correlated significantly with the Psychoticism scale (O'Boyle & Barratt, 1993).

Originally, Barratt conceptualised impulsivity as a uni-dimensional structure (Barratt, 1959), later as a tri-dimensional structure (Patton et al., 1995), consisting of motor impulsiveness (acting on the spur of the moment and perseverance), non-planning (self-control and cognitive complexity) and attentional impulsiveness (the ability to focus on the task at hand and cognitive instability).

#### 4.2 *Dickman (1990)*

Dickman's model of impulsivity has developed from research suggesting that impulsivity, as a component of Extraversion, is associated with individual differences in cognitive processing (Dickman, 1985; Eysenck & Eysenck, 1985; Harkins & Geen, 1975).

Dickman recognised that, to date, most impulsivity theories had examined impulsivity negatively, often associated with pathological conditions and poor outcome. Dickman (1990) noted that the consequences of impulsivity on cognitive functioning need not always be negative and can be positive or



functional under certain conditions. Therefore, Dickman suggests that impulsivity is composed of two main dimensions; Dysfunctional and Functional impulsivity. Dysfunctional impulsivity is the tendency to act with less forethought than most people of equal ability when this tendency is a source of difficulty. Conversely, functional impulsivity is the tendency to act with relatively little forethought when such a style is optimal and is associated with rapid error prone information processing.

#### 4.3 *Gray (1972, 1981)*

Gray proposed a neuropsychological theory (Gray, 1972, 1981), identifying two dimensions of personality; Impulsivity and anxiety. It is postulated that two mechanisms exist which explain individual differences in the two personality dimensions, the appetitive behavioural approach system (BAS), associated with the trait of impulsivity, and an avoidant behavioural inhibition system (BIS), which controls anxiety.

Whilst the BIS responds to signals of punishment and novel stimuli, the BAS responds to signals of reward, each responding to environmental stimuli by modifying approach/avoidance behaviour, attention and arousal levels. The BAS has a broad affective quality, making those with BAS sensitivity more likely to experience happiness and hope, showing greater proneness to engage in goal-directed efforts, and a tendency to experience positive feelings when exposed to reward cues.

Carver and White (1994) note a lack of agreement over whether impulsiveness reflects high BAS, or low levels of BIS. Gray's model (1981) is closely related to



Eysenck's model of personality, where impulsivity is related to Extraversion, and anxiety is related to, but differentiated from Neuroticism.

#### **4.4 Summary of general theories of impulsivity**

These three theories have been developed and revised using factor analysis to explain impulsivity as a multi-dimensional construct. Upon examination, all aim to place their construct of impulsivity within Eysenck's three factor model of personality. In revising his Impulsiveness Scale (BIS-11), Barratt aimed to define impulsiveness within the structure of Eysenck's Extraversion dimension (Patton et al., 1995), indeed, defining impulsivity as orthogonal to neuroticism, and impulsivity as linked to Psychoticism. Similarly, Dickman linked cognitive functioning to Extraversion, and his functional and dysfunctional scales are closely correlated with Eysenck's Venturesomeness and Impulsiveness respectively (Claes, Vertommen & Braspenning, 2000). Finally, Gray's neuropsychological model links impulsivity to Extraversion.

Again, this raises the question as to whether all the theories, despite their theoretical differences do measure similar facets of impulsivity. Whilst Dickman and Gray both include a facet of impulsivity which is adventurous and goal-directed, Barratt does not. Indeed, based on having the same factor structure and high correlations with each other (Claes et al., 2000), it is possible to argue that the Dickman and Eysenck theories actually measure a synonymous construct. It is not clear how each of Barratt's subscales correlate with Eysenck's Venturesomeness and Impulsiveness. Luengo, Carrillo de la Peña & Otero (1991)

failed to replicate Barratt's Attentional dimension, hence may be measuring something completely different to other theories of impulsivity.

## **5. Measurement of impulsivity**

Examination of the various operational definitions proposed to explain the construct of impulsivity and its influence on human behaviour, demonstrate the divergence among researchers as to the components of impulsivity. Some definitions describe the relationship between inadequate thought and future actions, such as, 'the tendency to deliberate less than most people of equal ability before taking action' (Dickman, 1990, p95). Other definitions incorporate the concept of risk taking behaviour, as a 'characteristic of people who act on the spur of the moment without being aware of any risk involved' (Eysenck, Easting & Pearson, 1984). Given these differences in both terminology and theoretical basis, there is equally little consensus in how to approach measurement of impulsivity. Various types of measure have been developed, many which assess differing facets of impulsivity. Table 2 summarises these different types of measures, their theoretical basis and the facets of impulsivity they claim to measure.

Of the measures, self-report tools are the most prevalent, and tend to assess impulsivity as a psychological process or trait. Numerous have been developed, some specifically as an impulsivity self-report measure, (e.g. Dickman, 1990), and others are embedded within a subscale of a general personality measure, (e.g. Buss & Plomin, 1975). Other measurement instruments include cognitive measures which tend to take two forms: Reaction time tasks (e.g. Kagan, Rosman, Day, Albert & Phillips, 1964), and Time Perception tasks (e.g. Barratt & Patton, 1983),



and behavioural measures examine a behavioural response style (e.g. Newman, Kosson & Patterson, 1992).

**Table 2.** A summary of impulsivity measures

<i>Measure</i>	<i>Type of measure</i>	<i>Theoretical basis</i>	<i>Test dimensions of impulsivity</i>
I-7, Eysenck et al., 1985	Self-report personality scale	Biosocial model of personality	1. Venturesomeness 2. Impulsiveness
BIS-11, Patton et al., 1995	Self-report personality scale	Integrated model of impulsivity: cognitive, social, behavioural and biological.	1. Non-planning 2. Motor 3. Cognitive
DII, Dickman, 1990	Self-report personality scale	Information processing approach to impulsivity	1. Functional, 2. Dysfunctional
BIS/BAS Scales, Carver & White, 1994	Self-report personality scale	Physiological model to impulsivity and anxiety – behavioural response style	1. Fun 2. Drive 3. Reward Responsiveness
MFFT, Kagan et al., 1964	Behavioural; Reaction time	Information processing approach to impulsivity	1. Latency 2. Error
Delay of gratification Newman et al., 1992	Behavioural; Reaction time	Physiological model of impulsivity – behavioural response style	1. Ability to delay gratification
TE/TP, Barratt & Patton, 1983	Cognitive; Time perception	Integrated model of impulsivity: cognitive, social, behavioural and biological.	1. Ratio score 2. Errors / accuracy
NEO-PI-R, Costa & McCrae, 1992	Self-report personality scale	Biosocial model of personality	1. Impulsiveness 2. Excitement Seeking 3. Self-discipline 4. Deliberation
EASI-III, Buss & Plomin, 1975	Self-report personality scale	Biosocial model of personality	1. Inhibitory control 2. Decision Time 3. Sensation seeking 4. Persistence
MPQ, Tellegen, 1982	Self-report personality scale	Biosocial model of personality	Uni-dimensional Construct

I-7 – Impulsiveness Questionnaire; BIS-11 – Barratts Impulsiveness Scale; DII – Dickman Impulsiveness Inventory; BIS/BAS – Behavioural Inhibition/Activation Scales; MFFT – Matching Familiar Figures Task; TE/TP – Time Estimation / Production; NEO-PI-R – NEO Personality Inventory Revised; MPQ – Multidimensional Personality Questionnaire.

## **5.1 Strengths and weaknesses of different measurement approaches**

Three main approaches to the measurement of impulsivity exist; Cognitive, behavioural and personality approaches. Questions are raised as to whether these three different approaches tap into different facets of impulsivity, and therefore are certain approaches more superior to others? The question underlying these issues, relates back to the differing theories of impulsivity, in terms of whether one views impulsivity as a personality trait, a cognitive facet, or a behavioural response style.

White et al., (1994) provided a summary of these three different measurement approaches. Whilst, the cognitive approach measures mental control and cognitive tempo (e.g. time estimation), behavioural approaches assess a disinhibited response style (e.g. delay of gratification). Finally, personality measures tap an enduring tendency to act without thinking, to be impatient, and to channel impulses into action.

Given the lack of clarity regarding the constitution of the impulsivity construct, it seems apparent that studies which rely on one type of measurement approach or a uni-dimensional measure, will only measure a narrow facet of impulsivity. In order to measure a broad facet of impulsivity, assessments should aim to employ measures from each of the measurement approaches. The following section reviews impulsivity assessment tools available from these different approaches.

## **5.2 Personality measures of impulsivity.**

### **5.2.1 Self-report impulsivity measures.**



#### *5.2.1.1 The Impulsiveness Questionnaire (I-7 - Eysenck et al., 1985)*

The I-7 is a self-report scale assessing two broad uni-dimensional facets of impulsivity; Impulsiveness and Venturesomeness, in addition to an Empathy scale. Eysenck et al., (1985) define impulsiveness as 'behaving without thinking and without realising the risk involved in the behaviour'. Venturesomeness is described as 'being conscious of the risk of the behaviour but acting anyway'.

The measure consists of 54 items (true/false format). The Impulsiveness subscale contains 19 items (e.g. Do you often do things on the spur of the moment?), whilst 16 items make up the Venturesomeness subscale, (e.g. Do you sometimes like doing things that are a bit frightening?). The remaining 19 items comprise the Empathy subscale. The scale was developed among 1320 normal adults, and the factor structure replicated among a further 589 adults. High internal reliabilities and test re-test scores were reported for Impulsiveness and Venturesomeness.

#### *5.2.1.2 Barratt Impulsiveness Scale (BIS-11, Patton et al., 1995)*

The BIS-11 consists of 30 items, which ask about the frequency of impulsivity-related behaviours or cognitions, each item being measured on a 4-point likert scale. The scale is based on a tri-dimensional model of impulsivity, which distinguishes between 'Motor impulsiveness' (11 items, e.g. I do things without thinking), 'Cognitive impulsiveness' (8 items, e.g. I don't pay attention) and 'Non-planning impulsiveness' (11 items, e.g. I plan tasks carefully).

The BIS-11 was developed among a sample of 412 undergraduates, 248 psychiatric inpatients, and 73 male prison inmates. Whilst the Principal Components Analysis replicated the Nonplanning and Motor impulsiveness

components, the study failed to identify a cognitive component, rather identified an ‘attentional impulsivity’ component (Patton et al., 1995). The authors reported acceptable internal reliability across their sample groups.

#### *5.2.1.3 Impulsivity Inventory (DII - Dickman, 1990)*

The DII is a self-report measure that distinguishes two types of impulsivity; Functional and dysfunctional. The measure consists of 46 items (true/false format). The Functional impulsivity subscale has 11 items, (e.g. I am uncomfortable when I have to make my mind up quickly), whilst 12 items make up the Dysfunctional subscale, (e.g. I often get into trouble because I don’t think before I act). The remaining 23 items are fillers.

Both subscales appear to have good psychometric properties. Dickman (1990) reported internal reliability coefficients for the Dysfunctional subscale as .85, and .74 for the Functional subscale. An exploratory analysis of the Dutch version of the DII (Claes et al., 2000), supported Dickman’s two-factor solution.

#### *5.2.1.4 Behavioural Inhibition / Activation Scales (BIS/BAS - Carver & White, 1994)*

The BIS/BAS were developed to provide a self-report measure of Gray’s theory of personality (1972, 1981). The scales consist of 24 items, each measured on a 4-point response scale, indicating level of agreement. The BIS subscale is made up of 7 items, which measure reactions to anticipated punishment. The BAS is composed of 3 separate subscales; Drive (4 items, e.g. I go out of my way to get things I want), Fun-seeking (4 items, e.g. I crave excitement and new sensations), and Reward Responsiveness (5 items, e.g. When I am doing well at something I love to keep at it).

Studies have generally supported the factor structure and the two distinct BIS/BAS scales, but suggested that the model of fit is not highly significant (Heubeck, Wilkinson & Cologon, 1998; Jorm et al., 1999). Studies have also raised doubts over the validity of the Reward responsiveness scale, due to low loadings, in addition to its loading onto both the BAS and BIS scales (Ross, Millis, Bonebright, & Bailey, 2002).

### **5.2.2. Global personality measures with an impulsivity subscale.**

#### *5.2.2.1 The NEO Personality Inventory-Revised (NEO-PI-R - Costa & McCrae, 1992)*

The NEO-PI-R is a 240-item self-report scale (5 point likert-scale format) that assesses the 5-factor personality model (OCEAN). The Neuroticism scale contains a 8-item Impulsiveness subscale. An individual scoring high on this subscale is described as being in control of his or her emotions and behaviours. The scale has very good psychometric properties in relation to internal reliability and test-retest correlations. The impulsivity items seem to measure only a narrow facet of impulsivity; i.e. the control of impulsive behaviours.

#### *5.2.2.2 EASI-III Temperament scale (Buss and Plomin, 1975)*

The EASI-III measures four basic temperaments; Emotionality, activity, sociability and impulsivity. The impulsivity scale (Buss and Plomin Impulsivity Scale - BPIS) contains 20 self-report items, each measured on a 5- point likert-scale format, and incorporates 4 subscales; Inhibitory control (e.g. Usually I can't stand waiting), decision time (e.g. I often have trouble making up my mind) persistence (e.g. I generally like to see things through to the end), and sensation seeking (e.g. I generally seek new and exciting experiences and sensations).



There are few published studies reporting data on psychometric properties and validity of the questionnaire, Buss and Plomin (1975) having cited only unpublished data. However, in a study by Braithwaite, Duncan-Jones, Bosly-Craft and Goodchild (1984) reliability coefficients of .61, .46, .40 and .54 were reported for the inhibitory control, decision time, sensation seeking and persistence subscales respectively.

#### *5.2.2.3 The Multidimensional Personality Questionnaire (MPQ - Tellegen, 1982)*

The MPQ is a 300-item self-report measure of personality (true/false format), containing 11 primary personality scales, 3 'higher order traits', and 6 validity scales.

The Control/Impulsiveness scale has 24 items such as, 'I often stop one activity before completing it and start another'. Low scores on this scale tend to indicate individuals who are 'impulsive and spontaneous; can be reckless and careless; prefers to play things by ear' (p8).

Tellegen (1982) derived all the items for the MPQ from factor analytic studies and this factor structure has been replicated in different samples. The psychometric properties of the scale in general are reported to be good. The internal reliabilities of the Control/Impulsiveness scale were found to be .86 in a sample of 500 female undergraduates, and .82 in 300 male undergraduates. Test re-test reliability among 75 undergraduates is reported to be .88.

The scale was developed as a uni-dimensional measure, however Parker, Bagby & Webster (1993) in their factor analytic study found the MPQ measured 2 dimensions of impulsivity; Cautious-spontaneous and methodical-disorganised.

### **5.2.3 Summary of Personality measures.**

Many other personality scales incorporate sub-scales which assess the impulsivity construct (e.g. Personality Research Form – PRF; Jackson, 1984) which was developed to examine two facets of impulsivity; Impulsivity and harm avoidance. In their factor analytic study however, Parker et al. (1993) found that the PRF assesses impulsivity as a uni-dimensional construct, and only measures ‘spontaneous thoughts and behaviours’.

## **5.3 Behavioural measures of impulsivity.**

### *5.3.1 Delay of Gratification task (Newman et al., 1992)*

Any delay of gratification is suggested to involve the consideration of future events, for which impulsive individuals are presumed to be more concerned for immediate events. Newman et al., (1992) developed a computer-based task to operationalise a paradigm whereby a less desirable but immediate monetary outcome is pitched against a more desirable but delayed one. The task tests the hypothesis that impulsive individuals are less able to delay gratification and are more likely to opt for the immediate outcome.

Newman et al., (1992) argue that the delay of gratification task can be used to assess the relative strength of the Behavioural Approach System (BAS), as impulsivity is mediated by the BAS system, which responds to signals of reward.

It is hypothesised that high impulsive individuals, characterised by a high BAS, should undergo an increase in arousal and an increased active approach in the presence of reward (Pickering, Diaz & Gray, 1995).

## **5.4 Cognitive measures of impulsivity**

### *5.4.1 Matching Familiar Figures Test (MFFT - Kagan et al., 1964)*

The MFFT was devised to operationalise the reflection-impulsivity construct, defined as ‘the tendency to reflect on the validity of problem solving under a very special condition, namely, when several possible alternatives are available and there is some uncertainty over which one is the most appropriate’ (Messer, 1976; p. 1026).

The test is a visual search task in which the subject is required to search a sample of pictures for an identical target picture, responding quickly and making the least amount of errors. It is considered that impulsive individuals tend to respond quickly and make a higher number of errors.

Although the MFFT has good psychometric properties (Messer, 1976), there are considerable doubts over the validity of the measure. Studies have shown that the MFFT has low and non-significant correlations with self-report measures (Parker & Bagby, 1997) and with other behavioural measures of impulsivity (Gerbing, Ahadi & Patton, 1987), possibly because performance variability on the MFFT is due to cognitive deficits, such as search strategy (Ault, Crawford & Jeffrey, 1972), rather than differences in impulsivity.



#### *5.4.2 Time estimation and production tasks (TE/TP - Barratt & Patton, 1983)*

Barratt (1983) argues that impulsive individuals have a faster cognitive tempo and respond more quickly in certain situations, implying they tend to overestimate the passage of time. Equally, time production tasks operationalise the hypothesis that impulsive individuals are more likely to over produce a determined time, i.e. believe they have waited for longer than the allotted period.

Studies tend to have supported these hypotheses and found that time estimation and production are highly negatively correlated (Gerbing et al 1987; White et al, 1994). Participants who overestimate time intervals also tend to signal sooner in the time production task. Findings from these studies suggest however, that individual variability in time judgement tasks reflect differences in cognitive ability rather than personality traits, such as impulsivity.

Such conclusions, suggest that alone, time estimation and production tasks are not an adequate measure of impulsivity. Examination of the validity data of these measures suggests that, despite high inter-correlations between time estimation and production tasks, time perception measures have non-significant relationships with self-report measures of impulsivity (Bachorowski & Newman, 1985), and other behavioural measures of impulsivity (Gerbing et al., 1987; Parker & Bagby, 1997).

### **5.5 Summary of measurement approaches**

An extensive range of assessment tools exists for the measurement of impulsivity. Attempts to establish which approach or single tool is preferable over others is difficult as correlational studies suggest different approaches are not comparable,

and measure different facets of impulsivity. Numerous studies have found little or no correlation between behavioural, self-report and cognitive measures (Gerbing et al., 1987; Parker & Bagby, 1997; White et al., 1994).

## **6. Factor Analytic studies of impulsivity measures.**

For researchers and clinicians attempting to measure impulsivity, questions arise as to which measures are examining that which we intend to measure, and additionally, do certain tools measure only a narrow facet of impulsivity, whilst others examine a broader construct. Numerous studies have attempted to clarify two main questions; Firstly, when one employs a measure of impulsivity, what exactly does it measure? Secondly, do different types of impulsivity measure, examine similar or fundamentally different facets of impulsivity? Table 3 provides a summary of six key factor analytic studies which have sought to answer these questions.

A landmark study is that by Gerbing et al., (1987) who analysed 378 items from self-report and behavioural impulsivity measures. Factor analysis identified 15 distinct components, 12 self-report and 3 behavioural impulsivity components, all with weak inter-correlations, particularly with the primary behavioural measure, the MFFT. Second order factor analysis of the 15 components yielded 3 broad impulsivity factors; Spontaneous, Not persistent, and Carefree, factors similar to the tri-dimensional model proposed by Barratt (1959).

Luengo et al. (1991) compared the component structure of the I-7 with the BIS-10 (Barratt, 1985), reporting a high correlation between the two measures.

Principal components analysis suggested that the two measures assess a two-



**Table 3.** A review of factor analytic studies of impulsivity measures.

<i>Study</i>	<i>Sample (n=)</i>	<i>Analysis method</i>	<i>Measures examined</i>	<i>Dimensions of Impulsivity</i>
1. Carrillo de la Pena et al. (1993)	School children (13-16yrs), Spain (n=46)	PCA	MFFT BIS-10 I-6	1. Self-reported impulsivity 2. Matching Familiar figures
2. Gerbing et al. (1987)	Undergraduates, USA (n=243)	Exploratory and Restricted PCA of 373 self report items.	PRF Imp Scale, EASI-III Imp Scale, BIS-8, BIS-10, I-5, I-7, Form A 16PF, SSS, MMPI (selected items), GZTS, MFFT, Reaction time, Time estimation Time perception	1. Spontaneous 2. Not persistent 3. Carefree
3. Luengo et al. (1991)	Undergraduates, Spain. (n=571)	PCA	I-7 BIS-10	1. Lack of thoughtfulness 2. Lack of planning
4. Parker et al. (1993)	Normal adults (n=252)	PCA of 6 dimensions.	PRF Imp. Scale MPQ Imp. Scale GZTS Restraint Scale	1. Cautious / Spontaneous 2. Methodical / Disorganised
5. White et al. (1994)	Boys, Pittsburgh Youth Study, USA. (n=404)	Exploratory and confirmatory PCA	Time perception, Stroop Task Trail making test, Circle tracing test Delay of gratification Card playing task, Teacher rated imp. Scale, Ego Undercontrol template Video ratings (restlessness/impatience)	1. Cognitive impulsivity 2. Behavioural impulsivity
6. Whiteside & Lynam (2001)	Undergraduates, USA (n=437)	Exploratory PCA	EASI-III Imp. Scale, DII, BIS-11, PRF Imp. Scale, MPQ Imp. Scale, SSS, TCI, NEO-PI-R, 14 extra impulsivity items	1. (Lack of) premeditation 2. Urgency 3. Sensation seeking 4. (Lack of) perseverance

MFFT, Kagan et al, 1964; BIS-10, Barratt, 1985; I-6, Eysenck et al, 1984; PRF, Jackson, 1974, 1984; SSS, Zuckerman, 1979, 1994; I-5, Eysenck & Hysenck, 1977; 16PF, Cattell, Eber & Tatsuoka, 1970; MMPI, Hathaway & McKinley, 1967; GZTS, Guilford, Guilford & Zimmerman, 1978; EASI-III, Buss & Plomin, 1975; Stroop, Doodrill, 1978; Circle tracing test, Bachorowski & Newman, 1985; Card Playing Task, Newman et al., 1987; Ego Undercontrol Template, Block & Block, 1980; Time Perception, Barratt & Patton, 1983; DII, Dickman, 1990; BIS-11, Patton et al., 1995; TCI, Cloninger et al., 1991; I-7, Eysenck et al., 1985; NEO-PI-R, Costa & McCrae, 1994.

dimensional construct of impulsivity; 'Lack of thoughtfulness' and 'lack of planning'. Although providing useful information about the component structure of two key self-report measures, the study is limited in validity as the measures were not standardised for the Spanish population being studied.

Given that many personality scales measure impulsivity as a uni-dimensional construct, Parker et al., (1993) provided an interesting study by examining the component structure of 3 widely used personality measures. The findings suggested that whereas the PRF impulsivity scale did support a uni-dimensional model, the MPQ control scale and the GZTS restraint scale supported a two and three-factor solution respectively. Further principal components analysis of the 6 subscales, suggested that together these subscales were essentially measuring two components of impulsivity, a cautious/spontaneous dimension and a methodical/ disorganised dimension, similar to the two factor model of Buss and Plomin (1975).

White et al., (1994) have carried out the most comprehensive factor analysis on 11 measures of impulsivity, including personality, cognitive and behavioural tools. The analysis revealed two impulsivity factors; Cognitive and behavioural. The cognitive factor related to effortful and planful cognitive performance, and seemed to tap an ability to switch between mental sets. Conversely, the behavioural factor was associated with having a disinhibited, undercontrolled behaviour, relating to self-reported and observer rated behavioural response styles.

The most recent factor analytic study to be carried out is that of Whiteside and Lynam (2001), who used the five-factor model of personality (FFM - McCrae & Costa, 1990) to explain the construct of impulsivity. Their model maintained that



four personality dimensions are related differentially to impulsive behaviours: Urgency, Premeditation (lack of), Perseverance (lack of), and Sensation seeking. These four factors corresponded with the FFM impulsivity-related facets, impulsiveness, deliberation, self-discipline and excitement, respectively. Whiteside and Lynam argue that discrete psychological processes exist that lead to impulsive behaviour, supporting lower order trait theories (e.g. Costa & McCrae, 1990; Eysenck, 1952). Furthermore, the authors suggest that impulsivity can be viewed as an artificial umbrella term that actually encompasses many different aspects of personality, which helps explain why researchers experience such difficulty finding a definition to encapsulate all these aspects of personality.

## **7. Conclusions**

There appears to be a general consensus that impulsivity is a lower order trait that is subsumed under different personality dimensions, and leads to impulsive-like behaviours. Indeed, this follows the typological theories of Hippocrates, and Eysenck, whose work recognises that impulsivity is linked to all aspects of personality (Eysenck, 1993), suggesting that impulsivity is not a specific personality trait. More recently, these findings have been extended by studies that have suggested impulsivity is an artificial umbrella term defined by a heterogeneous cluster of personality traits (Miller, Flory, Lynam & Leukefeld, 2003; Whiteside and Lynam 2001). To be considered a valid construct, therefore, impulsivity requires definition in all modalities, i.e. cognitive, behaviour, physiology and personality.

### *Research implications and future directions*

Currently, it appears that impulsivity research accommodating these four modalities provides the most interesting findings. Such research recognises the relationship

between attention, impulsive behaviour, arousal and personality (Dickman, 2000; Pickering et al., 1995; Rodriguez-Fornells, Lorenzo-Seva & Andres-Pueyo, 2002; Wallace, Newman & Bachorowski, 1991). Studies based on Gray's theories have reported positive links between arousal and BIS and BAS activity. Activation in these systems results in different approach or avoidance behaviours (fight vs. flight), as well as changes in attention to environmental signals (Pickering et al., 1995). Wallace et al. (1991) reported that anxious people tend to be behaviourally impulsive, because Neuroticism causes heightened levels of arousal, resulting in quicker reactions in the face of punishment cues. Dickman (2000) also proposed a theory of Attentional-fixity suggesting individuals with high levels of impulsivity benefit from arousal in attention demanding tasks, as arousal increases their ability to fix their attention on a task.

Application of such theories to DSM-IV disorders proves interesting, particularly in relation to the role of arousal in disorders which are characterised by impulsivity. For example, Attention Deficit Hyperactivity Disorder is characterised by reduced ability to inhibit a response (Schachar, Tannock & Logan, 1993) and low arousal. Impulse control disorders and paraphilias are characterised by increasing tension and arousal prior to specific acts, followed by decreasing tension and a failure to resist such urges.

*Do we have a reliable way of measuring impulsivity?*

The current review suggests there is evidence to support Block's 'jingle-jangle' phenomena (Block, 1995), whereby theorists are using the same label but measuring different aspects of impulsivity, and conversely, using different labels but measuring a synonymous construct. This is further evidenced by the current review of factor

analytic studies, suggesting many of the components could be collapsed into similar labels. For instance, general labels such as ‘spontaneous’, ‘lack of planning’ and ‘disorganised’, seem to refer to similar impulsivity constructs.

Impulsivity is comprised from a heterogeneous cluster of lower order traits and attempts to establish a measurement approach to such a generic feature is fraught with difficulty. Such an understanding explains why little understanding exists between individual measures and measurement approaches, and highlights the need for a different means of assessing the impulsivity construct. At present, an evaluation of the evidence indicates that the construct is considerably more complex than has been previously assumed to be. Examination of the clinical manifestations of impulsivity appears to be unique to the presentation of clinical disorders. Therefore caution must be applied when such a broad theoretical construct is used to relate to clinical disorders, this becomes even more important when impulsivity is applied to clinical decision-making.



## References

- American Psychiatric Association. (1994) Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (DSM-IV), American Psychiatric Association, Washington D.C.
- Ault, R. L., Crawford, D. E., & Jeffrey, W. E. (1972). Visual scanning strategies of reflective, impulsive, fast-accurate, and slow-accurate children on the Matching Familiar Figures test. *Child Development*, 43, 1412-1417.
- Bachorowski, J. A. & Newman, J. P. (1985). Impulsivity in adults: Motor inhibition and time estimation. *Personality and Individual Differences*, 6, 133-136.
- Barratt, E. S. (1959). Anxiety and impulsiveness related to psychomotor efficiency. *Perceptual and Motor Skills*, 9, 191-198.
- Barratt, E. S. (1965). Factor analysis of some psychometric measures of impulsiveness and anxiety. *Psychological Reports*, 16, 547-554.
- Barratt, E. S. (1972). Anxiety and impulsiveness: Toward a neuropsychological model. In C. Spielberger (Ed.), *Current trends in theory and research*, 1 (pp. 195-222). New York: Academic Press.
- Barratt, E. S. (1993). Impulsivity: Integrating cognitive, behavioural, biological and environmental data. In W. McCown and M. Shure (Eds.), *The Impulsive Client: Theory, Research and Treatment*. American Psychological Association, Washington. DC.

Barratt, E. S. (1994). Impulsiveness and aggression. In J. Monahan & H. J. Steadman (Eds.), *Violence and mental disorder: Developments in risk assessment* (pp.61-79). Chicago: University of Chicago Press.

Barratt, E. S., & Patton, J. H. (1983). Impulsivity: Cognitive, behavioural and psycho-physiological correlates. In M. Zuckerman (Ed.), *Biological bases of sensation seeking, impulsivity, and anxiety*. (pp. 77-116). Hillsdale, NJ: Erlbaum.

Block, J. (1995). A contrarian view of the five-factor approach to personality description. *Psychological Bulletin*, 117, 187-215.

Bonet, T. (1684). *Sepulchretum*. [The cemetery]. Paris.

Braithwaite, V., Duncan-Jones, P., Bosly-Craft, R., & Goodchild, M. (1984). A psychometric investigation of the usefulness of the EASI-III Temperament Survey in the Australian general population. *Australian Journal of Psychology*, 36, 85-95.

Buss, H. A., & Plomin, R. (1975). *A Temperament Theory of Personality Development*. New York: John Wiley & Sons.

Carver, C. S. & White, T. L. (1994). Behavioral Inhibition, Behavioural Activation, and Affective Responses to Impending Reward and Punishment: The BIS/BAS Scales. *Journal of Personality and Social Psychology*, 67, 319-333.



Corrulla, W. J. (1987). A psychometric investigation of the Eysenck Personality Questionnaire (revised) and its relationship to the I7 Impulsiveness Questionnaire. *Personality and Individual Differences*, 8, 651-658.

Claes, L., Vertommen, H. & Braspenning, N. (2000). Psychometric properties of the Dickman Impulsivity Inventory. *Personality and Individual Differences*, 29, 27-35.

Costa, P. T. & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI): Professional Manual*. Odessa, FL: Psychological Assessment.

Dickman, S. (1985). Impulsivity and perception: Individual differences in the processing of the local and global dimensions of stimuli. *Journal of Personality and Social Psychology*, 48, 133-149.

Dickman, S. J. (1990). Functional and Dysfunctional Impulsivity: Personality and Cognitive Correlates. *Journal of Personality and Social Psychology*, 58, No. 1, 95-102.

Dickman, S. J. (2000). Impulsivity, arousal and attention. *Personality and Individual Differences*, 28, 563-581.

Digman, J. M. (1997). Higher-order factors of the Big Five. *Journal of Personality and Social Psychology*, 73, 1246-1256.

Eysenck, H. J. (1952). *The Scientific Study of Personality*. London: Routledge and Kegan Paul.

Eysenck, H. J. (1967). *The Biological Basis of Personality*. Springfield: C. C. Thomas.

Eysenck, H. J. & Eysenck, S. B. G. (1975). *Manual of the Eysenck Personality Inventory*. San Diego: Educational and Industrial Testing Service.

Eysenck, H. J. & Eysenck, S. B. G. (1977). Block and Psychoticism. *Journal of Abnormal Psychology*, 86, 651-652.

Eysenck, H. J. & Eysenck, S. B. G. (1985). *Personality and individual differences*. New York: Plenum Press.

Eysenck, S. B. G. (1993). The I7: Development of a measure of impulsivity and it's relationship to the superfactors of personality. In W. G. McCown, J. L. Johnson & M. B. Shure (Eds.), *The Impulsive Client: Theory, Research and Treatment*. (pp. 141-149) American Psychological Association, Washington, DC.

Eysenck, S. B. G., Easting, G. & Pearson, P. R. (1984). Age norms for Impulsiveness, Venturesomeness and Empathy in children. *Personality and Individual Differences*, 5, 315-321.

Eysenck, S. B. G., Pearson, P. R., Easting, G. & Allsopp, J. P. (1985). Age norms for Impulsiveness, Venturesomeness and Empathy in Adults. *Personality and Individual Differences*, 6, 613-619.

Eysenck, S. B. G. & Eysenck, H. J. (1978). Impulsiveness and Venturesomeness: their position in a dimensional system of personality description. *Psychological Reports*, 43, 1247-1255.

Eysenck, S. B. G. & Zuckerman, M. (1978). The relationship between sensation-seeking and Eysenck's dimensions of personality. *British Journal of Psychology*, 69, 483-487.

Freud, S. (1960). Libidinal types. In *Collected papers* (J. Strachey, Ed. & Trans.; Vol. 21, pp. 216-236). London: Hogarth. (Original work published 1931).

Gerbing, D. W., Ahadi, S. A. & Patton, J. H. (1987). Toward a Conceptualisation of Impulsivity: Components across the Behavioural and Self-Report Domains. *Multivariate Behavioral Research*, Vol. 22, 357-379.

Gray, J. A. (1972). The psychophysiological basis of introversion-extraversion: A modification of Eysenck's theory. In V. D. Nebylitsyn & J. A. Gray (Eds.), *The biological bases of individual behaviour* (pp. 182-205). San Diego, CA: Academic Press.

Gray, J. A. (1981). A critique of Eysenck's theory of personality. In H. J. Eysenck (Ed.), *A model for personality* (pp. 246-276). Berlin: Springer-Verlag.

Griffin, D. W. & Bartholomew, K. (1994). The meta-physics of measurement: The case of adult attachment. In K. Bartholomew & D. Perlman (Eds.), *Advances in personal relationships* (Vol. 5, pp. 17-52). London: Jessica Kingsley.



Harkins, S., & Geen, R. G. (1975). Discriminability and criterion differences between extraverts and introverts during vigilance. *Journal of Research in Personality*, 9, 335-340.

Heubeck, B. G., Wilkinson, R. B. & Cologon, J. (1998). A second look at Carver and White's (1994) BIS/BAS Scales. *Personality and Individual Differences*, 25, 785-800.

Hull, C. L. (1943). *Principles of behavior*. New York: Wiley Interscience.

Jackson, D. N. (1984). *Personality Research Form Manual*. Port Huron, MI: Research Psychologists Press.

John, O. P. (1990). The "Big Five" factor taxonomy: Dimensions of personality in the natural language and in questionnaires. In L. A. Pervin (Ed.), *Handbook of personality: Theory and research* (pp. 66-100). New York: Guilford.

Jorm, A. F., Christenson, H., Henderson, A. S., Jacomb, P. A., Korten, A. E., & Rodgers, B. (1999). Using the BIS/BAS scales to measure behavioural inhibition and behavioural activation: Factor structure, validity and norms in a large community sample. *Personality and Individual Differences*, 26, 49-58.

Kagan, J., Rosman, B. L., Day, D., Albert, J., & Phillips, W. (1964). Information processing in the child: Significance of analytic and reflective attitudes. *Psychological Monographs*, Vol. 78 (1, Whole No. 578)



Luengo, M. A., Carrillo-de-la-Peña, M. T., & Otero, J. M. (1991). The components of impulsiveness: A comparison of the I7 impulsiveness questionnaire and the Barratt Impulsiveness Scale. *Personality and Individual Differences*, 12, 657-667.

McCrae, R. R., & Costa, P. T. Jr (1990). *Personality in adulthood*. New York: Guilford.

McCrae R. R. & Costa, P. T., Jr. (1996). Toward a new generation of personality theories: Theoretical contexts for the five factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 51-87). New York: Guilford.

Messer, S. B. (1976). Reflection-impulsivity: A review. *Psychological Bulletin*, 83, 1026-1052.

Miller, J., Flory, K., Lynam, D., Leukefeld, C. (2003). A test of the four-factor model of impulsivity-related traits. *Personality and Individual Differences*, In Press.

Newman, J. P., Kosson, D., & Patterson, C. M. (1992). Delay of gratification in psychopathic and nonpsychopathic offenders. *Journal of Abnormal Psychology*, Vol. 101, 630-636.

O'Boyle, M. & Barratt, E. S. (1993). Impulsivity and DSM-III-R personality disorders. *Personality and Individual Differences*, 14, 609-611.

Parker, J. D. A. & Bagby, R. M. (1997). Impulsivity in Adults: A Critical Review of Measurement Approaches. In C. D. Webster & M. A. Jackson (Eds.), *Impulsivity: Theory, Assessment and Treatment*. Guilford Press, New York.

Parker, J. D. A., Bagby, R. M. & Webster, C. D. (1993). Domains of the Impulsivity Construct: A factor analytic study. *Personality and Individual Differences*, Vol. 15, 267-274.

Patterson, C. M. & Newman, J. P. (1993). Reflectivity and learning from aversive events: Toward a psychological mechanism for the syndromes of disinhibition. *Psychological Review*, 100, 716-736.

Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology*, 51, 768-774.

Pickering, A. D., Diaz, A., & Gray, J. (1995). Personality and Reinforcement: an exploration using a Maze-Learning task. *Personality and Individual Differences*, 18, 451-458.

Pinel, P. (1801). *Traité medico-philosophique sur l'aliénation mentale* [medico-philosophical treatise on mental alienation]. Paris: Richard, Caille et Ravier.

Prichard, J. (1835). *A treatise on insanity*. London: Sherwood, Gilbert & Piper.

Queyart, F. (1896). *Les caractères et l'éducation morale* [Personality traits and moral education]. Paris: Alcan.

Rodriguez-Fornells, A., Lorenzo-Seva, U., & Andrés-Pueyo, A. (2002). Are high-impulsive and high risk-taking people more motor disinhibited in the presence of incentive? *Personality and Individual Differences*, 32, 661-683.

Ross, S. R., Millis, S. R., Bonebright, T. L., & Bailey, S. E. (2002). Confirmatory factor analysis of the Behavioral Inhibition and Activation Scales. *Personality and Individual Differences*, 33, 861-865.

Schachar, R., Tannock, R., & Logan, G. D. (1993). Inhibitory control, impulsiveness, and attention deficit hyperactivity disorder. *Clinical Psychology Review*, 13, 721-739.

Spence, K. W. (1956). *Behavior theory and conditioning*. New Haven, CT: Yale University Press.

Taylor, J. A. (1958). The effects of anxiety level and psychological stress on verbal learning. *Journal of Abnormal and Social Psychology*, 57, 55-60.

Taylor, J. A. & Spence, K. W. (1952). The relationship of anxiety level of performance in serial learning. *Journal of Experimental Psychology*, 44, 61-64.

Tellegen, A. (1982). *Multidimensional Personality Questionnaire*. Minneapolis, MN: University of Minnesota Press.

Wallace, J. F., Newman, J. P., & Bachorowski, J. A. (1991). Failures of response modulation: impulsive behaviour in anxious and impulsive individuals. *Journal of Research in Personality*, 25, 23-44.

Whiteside, S. P. & Lynam, D. R. (2001). The Five Factor Model and impulsivity: using a structural model of personality to understand impulsivity. *Personality and Individual Differences*, 30, 669-689.

Zuckerman, M, Kuhlman, D. M., Thornquist, M., & Kiers, H. (1991). Five (or three) robust questionnaire scale factors of personality without culture. *Personality and Individual Differences*, 12, 929-941.



## **Chapter II - Main Paper**

### **Impulsivity: Assessing the Component Structure of four Self-Report Measures.**

## Abstract

This study examined the component structure of impulsivity, by Principal Components Analysis of 12 subscales, from 4 widely used self-report measures of impulsivity. 245 subjects from the UK general population completed the Eysenck Impulsiveness Scale (Eysenck, Pearson, Easting & Allsopp, 1985), the Dickman Impulsiveness Scale (DII; Dickman, 1990), Barratt's Impulsiveness Scale (BIS-11; Patton, Stanford & Barratt, 1995) and the BIS/BAS Scales (Carver & White, 1994). Analysis of the subscales provided evidence in support of a 3-component structure of impulsivity. Components were labelled *Nonplanning Dysfunctional*, *Functional Venturesomeness* and *Drive / Reward Responsiveness*.

## **1. Introduction**

Various operational definitions of impulsivity have been proposed, each highly dependent on theoretical presuppositions (Pulkinnen, 1986). Studies have highlighted the lack of consensus about the theoretical underpinnings of impulsivity, the number of, and content of dimensions that constitute the construct (Gerbing, Ahadi & Patton, 1987; Parker, Bagby & Webster, 1993).

Given these differences in both terminology and theory, it is unclear whether the various measures which aim to operationalise models of impulsivity are empirically distinct, or whether they are, in fact highly related measures tapping the same construct. In order to investigate this issue, the aim of the present study is to analyse the component structure of four widely used self-report measures of impulsivity; the Dickman Impulsivity Inventory (DII), the Eysenck Impulsiveness Questionnaire (I7), the Barratt Impulsiveness Scale (BIS-11) and Carver and White's BIS/BAS scales.

Examination of various definitions of impulsivity highlight the difficulties faced when attempting to measure the construct. Some definitions describe the relationship between inadequate thought and future actions, such as that of Dickman, who defines impulsivity as, 'the tendency to deliberate less than most people of equal ability before taking action' (Dickman, 1990, p95). Other definitions may incorporate the concept of risk taking behaviour, as does Eysenck, for whom impulsivity is a 'characteristic of people who act on the spur of the moment without being aware of any risk involved' (Eysenck, Easting & Pearson, 1984, p.224). Coles describes impulsivity at a multi-faceted level, as involving 'an



impulse, the behavioural expression of that impulse, and the situation in which both occur', (Coles, 1997, p181).

A number of studies have investigated the structure of the impulsivity construct. Gerbing et al. (1987) identified three broad dimensions among self-report and behavioural measures of impulsivity. The first of these encapsulates a tendency to engage in spontaneous thoughts / behaviours, which could be otherwise labelled as restlessness or distractibility. A second broad dimension included in the measures was a tendency to be disorganised and unprepared in everyday activities. Thirdly, was a group of items, which could be labelled as having 'carefree' or 'happy-go-lucky' attitudes and behaviours.

Parker et al. (1993) describe a Principal Components analytic study on the impulsivity subscales of three widely used personality measures. The study revealed that the subscales of the Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982) and the Guilford-Zimmerman Temperament Scale (GZTS; Guilford & Zimmerman, 1949), which were both developed as unidimensional scales, were in fact made up of two similar structures, a cautious and a spontaneous factor, suggesting impulsivity could best be explained by a 2-component model.

This and other studies (White et al., 1994) suggest that impulsivity can be viewed as having multiple dimensions, rather than being measured as a unidimensional construct. Based on these findings, clinicians choosing a self-report measure of impulsivity should take care to insure that the measure does assess multiple components of impulsivity, rather than a single or narrow component.

It is hardly surprising that attempts to inter-correlate self-report measures of impulsivity have produced inconsistent findings. Whereas several studies have reported non significant correlations (Gerbing et al., 1987; Luengo, Carrillo de la Peña & Otero, 1991), others have described positive correlations between measures (Dickman, 1990; O'Boyle & Barratt, 1993, Parker & Bagby, 1997).

Of the most widely used self-report measures of impulsivity, the oldest is that devised by Barratt (1959), who was interested in the relationship between anxiety and impulsiveness. In this conceptualisation, impulsiveness is defined as a first order personality trait, closely linked to Eysenck's extraversion, sensation seeking and hypomania (Barratt & Patton, 1983). Barratt's original impulsivity measure was constructed to measure impulsivity as a unidimensional personality trait, but was later amended to incorporate six then three dimensions, the first multi-dimensional measure of impulsivity (Barratt, 1972; Barratt, 1985).

The current Barratt scale, BIS-11 (Patton, Stanford & Barratt, 1995) proposes that impulsivity be made up of three broad dimensions; Motor, Nonplanning and Cognitive impulsiveness. It is notable that the same study and that of Luengo et al. (1991) did not support a cognitive subscale; Patton et al. (1995) highlighted an 'attentional impulsiveness' subscale, suggesting that cognitive processes underlie impulsiveness in general, rather than constituting impulsivity per se.

A second well-developed measure of impulsivity is that of Eysenck (Eysenck's Impulsiveness Scale – I7; Eysenck, Easting, Pearson & Allsop, 1985). The scale is derived from a revision of Eysenck's Personality Inventory (Eysenck & Eysenck, 1964), which was developed to assess Eysenck's 3-dimensional hierarchical model

of personality (Eysenck, 1952). This model conceptualises the personality as being made up of three main traits; Extraversion, Neuroticism and Psychoticism.

Eysenck and Eysenck (1977) originally postulated that impulsivity was constructed of four main dimensions: narrow impulsiveness, risk taking, non-planning and liveliness. Following this, a Principal Components Analysis of impulsivity and sensation seeking scales suggested that there were only 2 components of impulsivity; Impulsiveness and Venturesomeness (Eysenck & Eysenck, 1978; Eysenck & Zuckerman, 1978).

The current Impulsiveness Scale (I7) contains 3 unidimensional subscales; Impulsiveness, Venturesomeness and an Empathy scale. These scales are closely correlated with Eysenck's Psychoticism, Extraversion and Neuroticism, respectively (Eysenck & Eysenck, 1978).

A third measure, developed specifically to investigate the construct of impulsivity is the Dickman Impulsiveness Scale (DII; Dickman, 1990). Dickman's model of impulsivity develops itself from evidence which links the personality dimension of Extraversion to cognitive functioning (Bone, 1971, Harkins & Geen, 1975). More specifically, research suggests impulsivity is the critical component of Extraversion that can be associated with individual differences in cognitive processing (e.g. Anderson & Revelle, 1983, Dickman, 1985, Eysenck & Eysenck, 1985).

In his attempt to clarify the nature of impulsivity, Dickman (1990) recognised that the consequences of impulsivity on cognitive functioning need not always be negative, and therefore proposed two dimensions of Dysfunctional and Functional



impulsivity. Dysfunctional impulsivity is the tendency to act with less forethought than most people of equal ability when this tendency is a source of difficulty. Conversely, functional impulsivity is the tendency to act with relatively little forethought when such a style is optimal.

A recent exploratory analysis of the Dutch version of the DII (Claes, Vertommen & Braspenning, 2000) supported the two-component solution found by Dickman. The results also showed significant correlations between the Dysfunctional subscale and Eysenck's Impulsiveness scale, as well as between the Functional subscale and the Venturesomeness scale.

A fourth measure is the BIS / BAS scales, developed by Carver and White (1994) to provide a self-report measure of Gray's theory of personality (1972, 1981). Gray proposed a neuropsychological theory, which identifies two dimensions of personality; Impulsivity and anxiety. It is postulated that two mechanisms exist which explain individual differences in the two personality dimensions, and these are the appetitive behavioural approach system (BAS), associated with the trait of impulsivity, and an avoidant behavioural inhibition system (BIS) which controls anxiety. According to Gray's model, impulsivity is closely related to Eysenck's extraversion, whilst anxiety is associated with Eysenck's neuroticism.

The BAS consists of three unidimensional subscales - Fun Seeking, Reward Responsiveness and Drive - along with the single BIS subscale, thereby suggesting a 4-factor structure of impulsivity (Carver & White, 1994). Attempts to replicate this factor analytic study have supported a 4-factor structure and the two distinct BIS/BAS scales, but indicate that the model of fit is not highly significant

(Heubeck, Wilkinson & Cologon, 1998; Jorm et al., 1999). Studies have also questioned the validity of the Reward Responsiveness scale, due to low loadings, in addition to its loading onto both the BAS and BIS scales (Jorm et al., 1999; Ross, Millis, Bonebright, & Bailey, 2002).

The increase in awareness of the need for accurate risk assessment in forensic populations (e.g. Harris, Rice & Quinsey, 1993) combined with the inclusion of impulsiveness in diagnostic criteria (e.g. DSM IV, APA, 1994; PCL-r - Hare, 1990) highlights the need for an adequate and consistent definition of the construct. Assessment of impulsivity clearly needs to be broad based and include a self-report measure, the choices of which are many. However, such assessments become increasingly difficult when considered against the ambiguity surrounding the construct, and the availability of numerous measures created to assess impulsivity.

The current study investigates the component structure underlying 4 widely used multi-dimensional self-report measures of impulsivity, 3 of which were specifically designed to examine the construct of impulsivity. It is hoped that the study will clarify which measures are assessing a broad or narrow facet of impulsivity. The study also aims to assess which measures, despite their different subscale labels, are in fact measuring a similar construct.

## **2. Method**

### **2.1 Participants**

Two hundred and forty five adults (108 men and 137 women), ranging in age from 18 to 82 years ( $M = 42.7$ ,  $SD = 15.4$ ) took part in the study. In order to reach a

representative sample of the UK population, questionnaires were allocated through a snowballing approach, in which colleagues, family and friends passed on questionnaires to their own families and friends.

The sample consisted of those in paid employment (76.3%), unemployed people (2.9%), students (2%), people retired from work (15.1%), and those in other conditions of employment (3.7%). Of those in paid employment 18.7% were postgraduate students.

Two hundred and eighty questionnaires were distributed in total, giving an excellent response rate of 89%. Booklets returned by 5 participants were excluded from the analysis, as each contained more than one page of missing data.

## **2.2 Measures**

### **2.2.1 Dickman Impulsivity Inventory- DII (Dickman, 1990)**

The Dickman Impulsivity Inventory is a self-report measure that distinguishes two types of impulsivity; Functional and Dysfunctional. The measure consists of 46 items (true/false format). The Functional Impulsivity subscale has 11 items, (e.g. I am uncomfortable when I have to make my mind up quickly), whilst 12 items make up the Dysfunctional subscale, (e.g. I often get into trouble because I don't think before I act). The remaining 23 items are fillers. Only the impulsivity related items are scored, and high scores indicate high levels of impulsivity.

Both subscales appear to have good psychometric properties. Dickman (1990), reported internal reliability coefficients for the Dysfunctional subscale as .85, and



.74 for the Functional subscale. The DII shows good construct validity against other self-report and behavioural measures of impulsivity.

### **2.2.2 Adult Impulsiveness Scale – I7 (Eysenck et al., 1985)**

The I7 is a self-report scale, which assesses two dimensions of impulsivity; Impulsiveness and Venturesomeness. Eysenck et al. (1985) define impulsiveness as ‘behaving without thinking and without realising the risk involved in the behaviour’. Venturesomeness is described as ‘being conscious of the risk of the behaviour but acting anyway’.

The measure consists of 54 items (true/false format). The Impulsiveness subscale contains 19 items, (e.g. Do you often do things on the spur of the moment?), whilst 16 items make up the Venturesomeness subscale, (e.g. Do you sometimes like doing things that are a bit frightening?). The remaining 19 items make up an Empathy subscale, with no filler items. High scores on each of the subscales indicate high levels of impulsivity and empathy.

Eysenck et al. (1985) report good reliabilities for the 3 individual subscales. Test-retest reliabilities were .78 and .90 for men and women on the Venturesomeness and Impulsiveness scales.

### **2.2.3 The BIS/BAS Scales (Carver & White, 1994)**

The Behavioural Inhibition and Behavioural Approach Scales consist of 24 self-report items, each measured on a 4-point response scale, with 1 indicating strong agreement and 4 indicating strong disagreement. The BIS subscale is made up of 7 items, which measure reactions to anticipated punishment. The BAS is composed

of 3 separate subscales; Drive (4 items, e.g. I go out of my way to get things I want), Fun-seeking (4 items, e.g. I crave excitement and new sensations), and Reward Responsiveness (5 items, e.g. When I am doing well at something I love to keep at it). There are no filler items.

Numerous studies have reported good internal reliability for the 4 subscales (Carver & White, 1994; Jorm et al., 1999; Ross et al., 2002).

#### **2.2.4 Barratt Impulsiveness Scale – BIS 11 (Patton et al., 1995)**

The most recent version of the Barratt Impulsiveness Scale, the BIS-11 (Patton et al., 1995) is made up of 30 items, which ask about the frequency of impulsivity-related behaviour or cognitions. Each item is measured on a 4-point scale, ranging from rarely/ never through to almost always, with no available neutral response. 4 indicates the most impulsive response, therefore, the higher the subscale score, the higher the level of impulsiveness.

The scale is based on a tri-dimensional model of impulsivity, which distinguishes between ‘Motor impulsiveness’ (11 items, e.g. I do things without thinking), ‘Cognitive impulsiveness’ (8 items, e.g. I don’t pay attention) and ‘Non-planning impulsiveness’ (11 items, e.g. I plan tasks carefully). There are no filler items.

Patton et al. (1995) reported acceptable internal reliability across their groups of undergraduates, psychiatric inpatients and male inmates.

## 2.3 Procedure

Participants were asked to complete a booklet containing 4 self-report questionnaires, as well as provide some basic demographic information about themselves (i.e. gender, date of birth, occupation) (see Appendix c). Feedback for individual scores was available upon request.

## 3. Results

### 3.1 Internal Consistency

Internal reliability coefficients for each of the 12 impulsivity measure subscales were found to be within acceptable limits and are presented in Table 1.

**Table 1.** Internal reliability coefficients, mean scores and standard deviations for impulsivity measure subscales.

	Alpha	Mean	SD
<b>Dickman Scale</b>			
Functional Impulsivity	.78	6.27	2.92
Dysfunctional Impulsivity	.84	2.84	2.97
<b>Eysenck Impulsiveness Scale</b>			
Impulsiveness	.82	6.38	4.07
Venturesomeness	.85	7.75	4.18
Empathy	.80	12.57	3.51
<b>BIS-11</b>			
Motor Impulsiveness	.70	22.4	4.46
Nonplanning Impulsiveness	.72	24.23	4.99
Cognitive Impulsiveness	.61	16.53	3.30
<b>BIS/BAS Scales</b>			
BAS – Fun	.73	11.22	2.37
BAS – Drive	.82	10.54	2.45
BAS – Reward Responsiveness	.73	16.6	2.18
BIS	.80	21.46	3.63

Of note, is that the standard deviation for the dysfunctional subscale on the Dickman measure, is larger than the mean, reflecting the sizeable variation in the scores obtained.



### 3.2 Relationship among impulsivity scales

Table 2 shows the correlations among each of the 12 subscales from the 4 impulsivity measures. Examination of Table 2 shows moderate positive correlations between the subscales, with the largest correlation .78 between dysfunctional impulsivity and impulsiveness. Of the subscales, Reward Responsiveness and Functional Impulsivity demonstrate the lowest correlations with other subscales.

**Table 2.** Correlation matrix for 10 impulsivity sub-scales

	1	2	3	4	5	6	7	8	9	10
<b>Dickman</b>										
1. Functional	-	.28	.37	.43	.39	.11	.11	.43	.42	.09
2. Dysfunctional			.78	.13	.56	.63	.45	.48	.28	.16
<b>Eysenck</b>										
3. Impulsiveness			-	.22	.58	.58	.52	.58	.41	.26
4. Venturesomeness				-	.35	.12	.17	.47	.26	.03
<b>BIS-11</b>										
5. Motor					-	.59	.51	.60	.40	.23
6. Non-planning						-	.53	.36	.18	.03
7. Cognitive							-	.37	.17	.25
<b>BIS/BAS</b>										
8. Fun								-	.59	.38
9. Drive									-	.41
10. Reward										-

Given that the Eysenck's empathy subscale and Carver & White's BIS scale are not proposed to measure impulsivity, they were removed from further analysis.

### 3.3 Principal Components Analysis

The 10 subscales from the 4 impulsivity measures were subjected to a Principal Components Analysis, followed by a Varimax rotation method. The Eigenvalue (Kaiser, 1970) and Scree test (Cattell, 1978) criteria were used to determine the number of factors to enter into the rotation.

Three components were found to have eigenvalues greater than 1.0, these accounted for 70.59% of variance. Examination of the Scree plot identified 1

component above the elbow, suggesting a 1-component solution (see Appendix d). However, both a one and two component solution were analysed and a three-component solution showed significantly higher loadings, suggesting a better fit.

The first component extracted, had an eigenvalue of 4.43 and accounted for 44.31% of the variance, and had 6 items with loadings over 0.40. Item loadings can be seen in Table 3. It can be seen that of the six items, Carver and White's Fun and Barratt's Motor subscales have multiple loadings onto components 2 and 3. This component taps a *Nonplanning, dysfunctional* facet of impulsivity.

The second component had an eigenvalue of 1.50 and accounted for 15.03% of the variance. There were 5 items with significant loadings onto this component. The most notable of these are Eysenck's Venturesomeness and Dickman's Functional Impulsivity, hence could be labelled, *Functional Venturesomeness*.

**Table 3.** Component loadings from the Principal Components Analysis of each of the Impulsivity measure subscales.

	Component		
	1	2	3
Dickman			
Functional Impulsivity	.12	<b>.79</b>	.13
Dysfunctional Impulsivity	<b>.83</b>	.16	.10
Eysenck			
Impulsiveness	<b>.79</b>	.26	.25
Venturesomeness	.00	<b>.82</b>	.00
BIS-11			
Motor Impulsiveness	<b>.68</b>	.41	.21
Non-planning Impulsiveness	<b>.87</b>	.00	.00
Cognitive Impulsiveness	<b>.73</b>	.00	.17
BIS/BAS			
Fun	.43	<b>.55</b>	.50
Drive	.16	.44	<b>.68</b>
Reward	.00	.00	<b>.91</b>

The final component extracted, accounted for 11.25% of the variance and had an eigenvalue of 1.12. Three items had loadings over 0.40 onto this component, the highest being Carver and White's Reward subscales, as well as its Drive subscale. The Fun subscale has significant loadings on all three components. This component primarily measures *Reward responsiveness and Drive*.

In order to investigate the underlying components, initial analyses of the items, which make up the 10 sub-scales were carried out using Principal Components Analyses, this suggested good construct validity for the Eysenck and Dickman scales, but weaker validity for the Barratt and Carver and White scales.

An individual analysis of items from the BIS-11 was also carried out to substantiate the current results which supported a unidimensional model. This analysis identified a strong one-component solution with the Scree Plot and nine components with eigenvalues above one. The items did not fit the tridimensional model identified by Patton et al. (1995).

#### **4. Discussion**

This study analysed the component structure of four widely used self-report measures of impulsivity in the UK. The results support evidence that impulsivity can be viewed as a multidimensional construct (Gerbing et al., 1987; Parker et al., 1993).

Analysis of the relationship between the subscales revealed that both the Dickman and the Eysenck scales share a similar 2 component structure, where dysfunctional impulsivity aligns itself with Eysenck's Impulsiveness, and functional with



Venturesomeness. The correlation matrix and item loadings onto the two components provide further evidence that the two components are indeed distinct, and that the impulsivity measures of Dickman and Eysenck measure the same components of impulsivity.

Data from the present study fail to support the proposed models of both Barratt and that of Carver and White. The BIS-11 (Barratt & Patton, 1995) was constructed to operationalise three dimensions of impulsivity, a component structure that has been replicated by component analytic studies such as that by Gerbing et al. (1987). However the current study suggests that the BIS-11 is a unidimensional scale, and fails to measure distinct facets of impulsivity. There may be a number of reasons for this; First, the internal reliability coefficients for the Barratt subscales were the lowest among the 12 impulsivity subscales, suggesting it has weak content validity. Secondly, studies have questioned the replicability of the cognitive scale (Luengo et al., 1991), and found that the subscale in question may be better labelled 'attentional impulsivity' (Barratt & Patton, 1995). Finally, Barratt and Patton (1983) emphasise that different measures are drawn from different personality theories, hence the measures may not be factorially comparable.

Likewise, data from this study does not support the three-component structure of the BAS Scales (Carver & White, 1994). Reward Responsiveness shows a very strong significant loading onto a single component. However, this also has significant loadings from the Fun and Drive items, suggesting a single BAS component.

Again, it is notable that the Fun and Drive subscales do have a high inter-correlation, whereas the Reward subscale has very low correlations with all other subscales, the highest being the other two BAS subscales. This may suggest that the Reward subscale is not adequately measuring any facet of impulsivity. The current findings are substantiated by studies that have failed to support the existence of the Reward subscale (Jorm et al 1998; Ross et al 2002), as well as those who have queried the four component structure of the BIS/BAS scales (Heubeck et al., 1998; Jorm et al., 1999).

The reported Principal Component Analysis of the various subscales suggests that impulsivity can best be construed as a three-component structure; *Nonplanning / Dysfunctional*, *Functional Venturesomeness*, and *Reward Responsiveness / Drive*. This is in agreement with other 3 dimensional models of impulsivity (Gerbing et al., 1987; Patton et al., 1995). The findings suggest that the first two components are more adequately measured by the impulsivity scales currently under investigation. It is unclear whether either the Dickman, Eysenck and Barratt scales fail to adequately measure the impulsivity construct in full, or whether the Reward Responsiveness and Drive subscales measure some facet outside the impulsivity construct. This latter argument would support a two-component model of impulsivity (e.g. Buss & Plomin, 1975; Dickman, 1990; Eysenck & Zuckerman, 1978; Parker et al., 1993; White et al., 1994).

This current study has advantages over the previous studies of Gerbing et al. (1987) and Parker et al. (1993), as it does not use a limited sample of the population such as undergraduates, hence the results are more generalisable. This study adds to

previous research as it uses a UK sample, whereas most studies have included North American or Canadian subjects.

It is clear from the results that Eysenck's Impulsiveness and Dickman's Dysfunctional Impulsivity are indeed measuring a similar facet of impulsivity; however, the results suggest a significant, yet weaker relationship between Venturesomeness and Functional Impulsivity. This comparative lack in concordance may reflect the difference in item content between the two subscales. Venturesomeness contains items which describe acts of risky *behaviour*, the consequences of which may be life threatening. Conversely, Functional Impulsivity focuses largely on *cognitive processes*, whereby the consequences of being risky or impulsive are not as threatening to the individual, (indeed, can be positive).

This present study is a useful guide when choosing a self-report tool for the assessment of impulsivity, and provides further evidence that care should be taken when employing a particular measurement tool, which may only examine a narrow facet of impulsivity.

This study suggests that statistically, impulsivity is best defined as a three-component model. However, given the theoretical ambiguity of the third component, the choice of an appropriate self-report measure of impulsivity may be led by those measures which adequately operationalise the dominant two components suggested in this study. Only two of the impulsivity scales investigated here demonstrate two distinct facets of impulsivity, those being the Eysenck Impulsiveness Scale and the Dickman Impulsiveness Inventory, which seem to be measuring a common impulsivity construct.



## References

- American Psychiatric Association. (1994) Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (DSM-IV), American Psychiatric Association, Washington D.C.
- Anderson, K. J., & Revelle, W. (1983). The interactive effects of caffeine, impulsivity, and task demands on a visual search task. *Personality and Individual Differences*, 4, 127-134.
- Barratt, E. S. (1959). Anxiety and impulsiveness related to psychomotor efficiency. *Perceptual and Motor Skills*, 9, 191-198.
- Barratt, E. S. (1972). Anxiety and impulsiveness: Toward a neuropsychological model. In C. D. Spielberger (Ed.), *Anxiety: Current trends in theory and research* (Vol. 1, pp. 195-222). New York: Academic Press.
- Barratt, E. S. (1985). Impulsiveness defined within a systems model of personality. In C. D. Spielberger & J. M. Butcher (Eds.), *Advances in personality assessment* (Vol. 5, pp. 113-132). Hillsdale, NJ: Erlbaum.
- Barratt, E. S. & Stanford, M. S. (1995). Impulsiveness. In C. G. Costello (Ed.), *Personality Characteristics of the Personality Disordered* (pp. 91-119). John Wiley & Sons, Inc.

Bone, R. N. (1971). Interference, extraversion, and paired-associated learning. *British Journal of Social and Clinical Psychology*, 10, 284-285.

Carver, C. S. & White, T. L. (1994). Behavioral Inhibition, Behavioral Activation, and Affective Responses to Impending Reward and Punishment: The BIS/BAS Scales. *Journal of Personality and Social Psychology*, 67, No. 2, 319-333.

Cattell, R. B. (1978). *The Scientific use of factor analysis in behavioural and life sciences*. New York: Plenum.

Claes, L., Vertommen, H. & Braspenning, N. (2000). Psychometric properties of the Dickman Impulsivity Inventory. *Personality and Individual Differences*, 29, 27-35.

Coles, E. M. (1997). Impulsivity in Major Mental Disorders. In C. D. Webster & M. A. Jackson (Eds.), *Impulsivity: Theory, Assessment and Treatment* (pp. 180-194). New York: Guilford Press.

Dickman, S. (1985). Impulsivity and perception: Individual differences in the processing of the local and global dimensions of stimuli. *Journal of Personality and Social Psychology*, 48, 133-149.

Dickman, S. J. (1990). Functional and Dysfunctional Impulsivity: Personality and Cognitive Correlates. *Journal of Personality and Social Psychology*, 58, No. 1, 95-102.

Dickman, S. J. (2000). Impulsivity, arousal and attention. *Personality and Individual Differences*, 28, No. 3, 563-581.

Eysenck, H. J. (1952). *The Scientific Study of Personality*. London: Routledge and Kegan Paul.

Eysenck, H. J. & Eysenck, S. B. G. (1964). *Manual of the Eysenck Personality Inventory*. London: University of London Press.

Eysenck, S. B. G. & Eysenck, H. J. (1978). Impulsiveness and Venturesomeness: their position in a dimensional system of personality description. *Psychological Reports*, 43, 1247-1255.

Eysenck, S. B. G., Easting, G. & Pearson, P. R. (1984). Age norms for Impulsiveness, Venturesomeness and Empathy in children. *Personality and Individual Differences*, 5, 315-321.

Eysenck, S. B. G., Pearson, P. R., Easting, G. & Allsopp, J. P. (1985). Age norms for Impulsiveness, Venturesomeness and Empathy in Adults. *Personality and Individual Differences*, 6, 613-619.

Eysenck, S. B. G. & Zuckerman, M. (1978). The relationship between sensation-seeking and Eysenck's dimensions of personality. *British Journal of Psychology*, 69, 483-487.

Gerbing, D. W., Ahadi, S. A., & Patton, J. H. (1987). Toward a conceptualisation of impulsivity: Components across the behavioral and self-report domains. *Multivariate Behavioral Research*, 22, 357-379.



Gray, J. A. (1972). The psychophysiological basis of introversion-extraversion: A modification of Eysenck's theory. In V. D. Nebylitsyn & J. A. Gray (Eds.), *The biological bases of individual behaviour* (pp. 182-205). San Diego, CA: Academic Press.

Gray, J. A. (1981). A critique of Eysenck's theory of personality. In H. J. Eysenck (Ed.), *A model for personality* (pp. 246-276). Berlin: Springer-Verlag.

Hare, R. D. (1991). *The Hare Psychopathy Checklist - Revised*. Toronto, Ontario: Multi-Health Systems.

Harkins, S., & Geen, R. G. (1975). Discriminability and criterion differences between extraverts and introverts during vigilance. *Journal of Research in Personality*, 9, 335-340.

Harris, G. T., Rice, M. E. & Quinsey, V. L. (1993). Violent recidivism of mentally disordered offenders: The development of a statistical prediction instrument. *Criminal Justice and Behavior*, 20, 315-335.

Heubeck, B. G., Wilkinson, R. B. & Cologon, J. (1998). A second look at Carver and White's (1994) BIS/BAS scales. *Personality and Individual Differences*, 25, 785-800.

Jorm, A. F., Christensen, H., Henderson, A. S., Jacomb, P. A., Korten, A. E., & Rodgers, B. (1999). Using the BIS/BAS scales to measure behavioural inhibition and behavioural activation: Factor structure, validity and norms in a large community sample. *Personality and Individual Differences*, 26, 49-58.

- Kaiser, H. F. (1970). A second generation little jiffy. *Psychometrika*, 35, 401-416.
- Luengo, M. A., Carrillo-de-la-Peña, M. T. & Otero, J. M. (1991). The components of impulsiveness: A comparison of the I7 impulsiveness questionnaire and the Barratt Impulsiveness Scale. *Personality and Individual Differences*, 12, 657-667.
- O'Boyle, M. & Barratt, E. S. (1993). Impulsivity and DSM-III-R personality disorders. *Personality and Individual Differences*, 14, 609-611.
- Parker, J. D. A. & Bagby, R. M. (1997). Impulsivity in Adults: A Critical Review of Measurement Approaches. In C. D. Webster & M. A. Jackson (Eds.), *Impulsivity: Theory, Assessment and Treatment*, (pp. 142-157). New York: Guilford Press.
- Parker, J. D. A., Bagby, R. M., & Webster, C. D. (1993). Domains of the Impulsivity Construct: A factor analytic investigation. *Personality and Individual Differences*, 15, 267-274.
- Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology*, 51, 768-774.
- Pulkinnen, L. (1986). The role of impulse control in the development of antisocial and prosocial behaviour. In D. Olewus, J. Block and M. Radke-Yarrow (eds.), *Development of Antisocial and Prosocial Behaviour: Research, Theories and Issues*. New York: Academic Press.

Ross, S. R., Millis, S. R., Bonebright, T. L., & Bailey, S. E. (2002). Confirmatory factor analysis of the Behavioral Inhibition and Activation Scales. *Personality and Individual Differences*, 33, 861-865.

White, J. L., Moffitt, T. E., Caspi, A., Jeglum-Bartusch, D., Needles, D. J., & Stouthamer-Loeber, M. (1994). Measuring Impulsivity and Examining Its Relationship to Delinquency. *Journal of Abnormal Psychology*, 103, 192-205.



## **Chapter III - Brief Paper**

**A pilot study to investigate the Attentional-Fixity theory of impulsivity (Dickman, 1993, 1996) among a UK sexual offending sample.**

## **Abstract**

The current pilot study examines the Attentional-fixity theory (Dickman, 1993, 1996) of impulsivity, arousal and performance, using a visual search task containing sexual stimuli in a small sample of sexual offenders. The findings failed to support the theory that arousal improves performance in a cognitive task, rather that performance, as measured by error rate and reaction time, decreases when individuals were presented with sexual stimuli. The findings also fail to support the hypothesis that high impulsivity is associated with an inability to fix attention on a source of input. The findings suggest that the current sample of sexual offenders, as a high impulsive group, tend to fix their attention on sexual stimuli and become distracted from other cognitive demands.

## **1. Introduction**

Numerous studies have highlighted the role of impulsivity in explaining performance differences on various cognitive tasks (Dickman, 2000; Gerbing, Ahadi & Patton, 1987; Malle & Neubauer, 1991). Such findings are based on the hypothesis that highly impulsive individuals tend to make quick decisions and to act without careful deliberation (Parker, Bagby & Webster, 1993), hence would be observed to respond quickly and make many errors in certain cognitive tasks.

Many theories have been put forward to explain these performance differences (Dickman, 2000; Eysenck, 1993; Matthews, 1987; Revelle, 1987), each of these incorporating different levels of emphasis of the roles of attention and arousal on the relationship between impulsivity and performance.

Dickman (2000) compared four main theories of impulsivity-related differences in order to clarify the roles of arousal and attentional processes on performance in a visual search task. The findings supported his theory of Attentional Fixity (Dickman, 1993, 1996), which suggest that impulsivity-related differences in performance are caused by differences in mechanisms which allocate and shift attention.

### **1.1 The Attentional Fixity Theory – Dickman (1993, 1996)**

Dickman's model of impulsivity develops from evidence which links the personality dimension of Extraversion to cognitive functioning (Harkins & Geen, 1975). More specifically, research suggests that impulsivity is the critical component of Extraversion, which can be associated with individual differences in cognitive



processing (e.g. Anderson & Revelle, 1983, Dickman, 1985, Eysenck & Eysenck, 1977).

Dickman's theory proposes that performance differences between high and low impulsives occur because of differences in the degree of attention fixed on the current source of input. Whereas the attention of low impulsives is difficult to shift, high impulsives can be relatively easily shifted from a fixation. This suggests that high impulsives act with little forethought, because during the period when they are deciding how to respond, they have difficulty keeping their attention fixed on the decision-making process.

Therefore, Dickman proposes that tasks which have high attentional demands will suit low impulsives, due to their tendency to fix their attention on the source of input. Conversely, tasks which require rapid attention shifting will not be suited to low impulsives, and will produce comparatively higher performance levels for high impulsives. It is proposed that visual search tasks rely on these two cognitive abilities, to both shift attention between visual items, by a rapid scanning process, and to maintain or fixate attention during a relatively low stimulation, repetitive task (See Treisman & Gelade, 1980).

## **1.2 Arousal**

In his theory, Dickman notes that arousal can alter the individual's ability to fix their attention on a salient piece of information (Easterbrook, 1959). Because Dickman's theory suggests that highly impulsive individuals have difficulty fixing their attention on the current source of input, it is proposed that arousal will improve their

performance. For low impulsives, arousal will have the opposite effect, and increase their likelihood to remain fixated on the current source of input.

Dickman's study highlighted the importance of specifying the nature of the arousal being studied, as there exist different types of arousal. Thayer (1978) identified two types of arousal; tense arousal, which is similar to anxiety, and energetic arousal, which is more like a state of alertness. The study used the Thayer Adjective Check List as a self-report measure of arousal (Thayer, 1978), to identify whether each individual was high or low in tense or energetic arousal.

### **1.3 Types of impulsivity**

In his attempt to clarify the nature of impulsivity, Dickman (1990) recognised that the consequences of impulsivity on cognitive functioning need not always be negative, giving rise to the two dimensions of Dysfunctional and Functional impulsivity, both operationalised in the Dickman Impulsiveness Inventory (DII; Dickman, 1990).

Dysfunctional impulsivity is the tendency to act with less forethought than most people of equal ability when this tendency is a source of difficulty. Dickman proposes that dysfunctionally impulsive individuals have a 'tendency to engage in rapid, error prone information processing because of an inability to use a slower more methodical approach under certain circumstances' (p.101). Conversely, functional impulsivity is described as a tendency to act with relatively little forethought when such a style is optimal. Such individuals seem to 'engage in rapid error prone information processing when such a strategy is rendered optimal by the individuals other personality traits' (p.101).

#### **1.4 Main findings of Dickman's (2000) study**

Dickman's study supported the theory of Attentional-fixity, that in an attention-demanding task, arousal increases the performance of highly dysfunctional individuals, and hinders the performance of low dysfunctional impulsives. The results suggest that it was energetic arousal, rather than tense arousal that related to the changes in performance. The results also found that both error rate and time per item increased with string length, i.e. as the attentional demands of a task increased.

Dickman also reported significant effects between dysfunctional impulsivity and response time. This again is supportive of the attentional-fixity theory as it would be expected that low dysfunctional impulsives with high arousal tend to be impaired in attention demanding tasks, because they display a slow speed in which they can shift attention.

Conversely, Dickman reported that high levels of arousal were linked to shorter response times in high dysfunctional impulsives. This relates to the idea that as arousal increases in highly impulsive individuals, their ability to fixate attention and perform also increases.

#### **1.5 Current Study**

The current study aims to test Dickman's theory of Attentional Fixity (Dickman, 1993, 1996) among a small sample of sexual offenders. The purpose of the study is to examine whether arousal will induce a significant change in performance on an attention-demanding visual search task, among high and low impulsive individuals. The study utilises a computer generated visual search task, which incorporates



targets of body images, of both a sexual and non-sexual nature. Although the study aims to test Dickman's theory of attentional-fixity, the study is a pilot study of the current methodology.

## **1.6 Design**

The current study examines the relationship between impulsivity, arousal and performance on a visual search task.

### **1.6.1 Impulsivity**

Individuals were categorised as high or low impulsives for both the functional and dysfunctional scales of the Dickman Impulsiveness Inventory (DII - Dickman, 1990). Categorisation was based on median splits generated from a previous Principal Components analytic study (Miller, Joseph & Tudway, 2003), where a UK population sample completed the DII (N=242). Based on this sample, mean scores for the dysfunctional scale were 2.84 (SD 2.97), and for the functional scale, 6.27 (SD 2.93).

### **1.6.2 Arousal**

This study will examine physiological arousal, indicated by a measure of galvanic skin response (Tarchanoff, 1889). In their recent study of impulsiveness and arousal, Mathias and Stanford (2002) found that physiological measures, such as heart rate monitors, are a useful means of measuring the impulsivity-arousal relationship. Their study suggested that high impulsives have slower heart rate under rest, and show more significant increases in heart rate during tasks demanding attention.

### **1.6.3 Visual search task**

The current study employed a computerised visual search task, where the individual searches for a target depicting a human body part. The study therefore involved a within-category search as all the targets and distractor items are body images.

Dickman and various other studies found that within-category searches involve greater attentional demands than between-category searches as the former requires individual processing of each item, therefore results in longer response times with greater numbers of items (Dickman, 2000; Gleitman & Jonides, 1976; Ingling, 1972).

The current design replicates the display sizes used by Dickman (2000), therefore randomly presents either 4, 6, 8 or 10 characters.

## **2. Method**

### **2.1 Participants**

The participants were seven males with a mean age of 28.2 years. Each of the participants has a mild learning disability (WAIS-III FSIQ 62-68) and all are detained under the Mental Health Act (1983) under the category of Mental Impairment and Psychopathic Disorder. None of the participants have a diagnosis or active symptoms of mental illness. The average length of hospital stay is 6.5 years (range 2-13.5 years) and all participants have at least one conviction for a serious sexual offence and continue to present a significant risk of sexual aggression.

## **2.2 Measures**

### **2.2.1 Dickman Impulsiveness Inventory (DII; Dickman, 1990)**

The DII is a self-report measure that distinguishes two types of impulsivity; Functional and Dysfunctional (See Appendix c). The measure consists of 46 items (true/false format). The Functional Impulsivity subscale has 11 items, (e.g. I am uncomfortable when I have to make my mind up quickly), whilst 12 items make up the Dysfunctional subscale, (e.g. I often get into trouble because I don't think before I act). The remaining 23 items are fillers. Only the impulsivity related items are scored, and high scores indicate high levels of impulsivity.

Both subscales appear to have good psychometric properties. Dickman (1990), reported internal reliability coefficients for the Dysfunctional subscale as .85, and .74 for the Functional subscale. The DII shows good construct validity against other self-report and behavioural measures of impulsivity.

### **2.2.2 Visual Search Task**

The visual search task is based on the Matching Familiar Figures Task (MFFT - Kagan, Rosman, Day, Albert, & Phillips, 1964), where the participant is presented with a target stimulus, and then presented with similar figures, and asked to identify the identical figure in as quick a time as possible. In the current study, the participant must indicate if the original target stimulus is present or absent in the second group of figures.

In the present study, the participant was required to search for human body images on the screen of a laptop computer, running on DOS mode. The laptop used an



LCD screen, which removed the problem of 'after-image' once the stimuli were removed from the screen. Each of these body images were black and white line drawings, and included both sexual and non-sexual images (See Appendix e). The LCD screen had a resolution of 800x600 pixels, with a grid dimension of 3x4, and each image was 100x100 pixels.

The task included four blocks, the first of which was both a practice block and also used as a means of reducing anxiety in order to provide a base-line physiological measure for the second block. The second block was the first experimental block and involved presentation of non-sexual images only. The third block was the same as the previous block but the target and distractor items were sexual human body images. Finally, the fourth block was a replication of the second block.

Physiological measures were taken throughout blocks one to four.

The practice block included four trials, one at each display size (4, 6, 8, 10). Block two and four were identical and included 16 trials, with four at each display size. The third trial (sexual images) involved 12 trials, with three trials for each display size. The presentation of trials within each block was randomly determined, hence the items from blocks two and four appeared in a different order.

Target images appeared on the screen for approximately 1 second, and were then followed by the presentation of distractor items, either including or excluding the original target item. Participants were asked to press allocated buttons to indicate whether they thought the target image is present or absent. Distractor images remained on the screen for a maximum of 30 seconds, unless the participant indicated his choice prior to this. When a choice was not made after a 30 second

duration, the next trial was automatically presented, and the participant was deemed to have scored this item incorrectly. The computer recorded information for each individual relating to mean response time per item, as well as recording the number of errors made (see Appendix f for raw data).

### **2.2.3 Galvanic Skin Response**

The current study used a Galvanic Skin Response (GSR – Tarchanoff, 1889) sensor as a physiological indicator of arousal. The GSR measures the skin's conductance between two electrodes placed on the participant's fingers, and by applying a small voltage. The GSR works because when arousal increases, the fight or flight system within the autonomic nervous system releases adrenaline, which causes sweating and consequently a change in the skin's conductance.

The two electrodes were attached to the forefinger and the thumb on the same hand of the participant. Measures of arousal were to be taken following the presentation of each item within the visual search task (see Appendix g). There was a potential delay of up to 20 seconds between the presentation of each item in order for arousal to re-stabilise. The GSR provides a measure of arousal in Ohms.

## **2.3 Procedure.**

All participants gave their informed consent to take part in the study (see Appendix h) following ethical approval from the local MREC. Each participant was seen individually within the hospital site, some with nursing staff present for additional support. All were tested between 10.00a.m and 5.00p.m, and testing periods lasted on average 45 minutes.

Each individual was provided with brief instructions as to the nature of the task and the questionnaire, and given an opportunity to ask any questions related to the testing. Participants were given a practice session of the visual search task using picture cards, primarily to elicit if they understood the nature of the task, and secondly to reduce any anxiety associated with using a computer. The GSR sensors were then attached to the finger and thumb of the participants, and the participant oriented to the laptop and the keys to be pressed. Coloured stickers were placed on the laptop keys to provide large areas to signify 'present' and 'absent' targets. This was done to reduce the effects of searching for a key on the overall reaction time. Participants were reminded that they had to respond in as quick a time as possible. On-screen instructions were provided throughout the testing, informing participants which buttons to press and when a block had ended.

Questions from the Dickman Impulsiveness Inventory were then visually presented in large print to each participant, while being read out by the tester. This was to counteract any reading difficulties. Care was taken to ensure that participants understood questions, by asking further questions and providing examples to the participants where necessary.

It was agreed between participants and nursing staff, that each participant will receive feedback in an anonymous format, to be discussed with nursing staff at a group held weekly on the unit.



### 3. Results

Given the small sample size, multiple regression was not viable in the current study. Instead, the data were analysed by calculating and comparing average scores across the different conditions, facilitating the examination of the interaction of arousal, reaction times, errors and impulsivity.

#### 3.1 Reaction times

Reaction times were calculated for each trial within each block. Within each trial, some targets were present, whilst others were absent. Average reaction times for absent and present targets trials are presented below in table 1. The table also indicates the slope for reaction times across display sizes in both the absent and present conditions.

<b>Table 1: Raw Reaction Times</b>					
	Display size				
<b>Target Absent</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>10</b>	<b>Slope</b>
Block 2	2113.71	3139.29	3730.14	3399.38	222.39
Block 3	5711.00	4910.86	5756.29	4669.50	-113.95
Block 4	2127.43	3989.57	4741.36	3097.67	183.13
<b>Target Present</b>					
Block 2	1753.29	2620.57	2370.93	2586.71	112.53
Block 3	4410.43	3175.00	4238.86	9775.14	857.90
Block 4	1612.62	1989.14	2010.00	1818.43	31.91

*Slope of the linear regression line through data points in y and x. The vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.*

Examination of the raw reaction times, shows that reaction times tended to be quicker for present targets than absent targets, across all display sizes. Comparison of the data between blocks, shows that block 3 (sexual stimuli) has longer reaction times than blocks 2 and 4. Reaction times across block 3 are longer for each display size and absent and present targets. Regarding blocks 2 and 4, there are no clear differences in reaction times between the two blocks.

The table provides slope data for the display sizes in both absent and present conditions, and shows that the mean raw reaction times increase with increased display size in each block, apart from block 3 in the absent target condition. Figures 1 and 2 show the slopes for the mean reaction times and display sizes, in both the absent and present conditions.

**Figure 1:** Mean reaction times for each block and display size – Absent targets

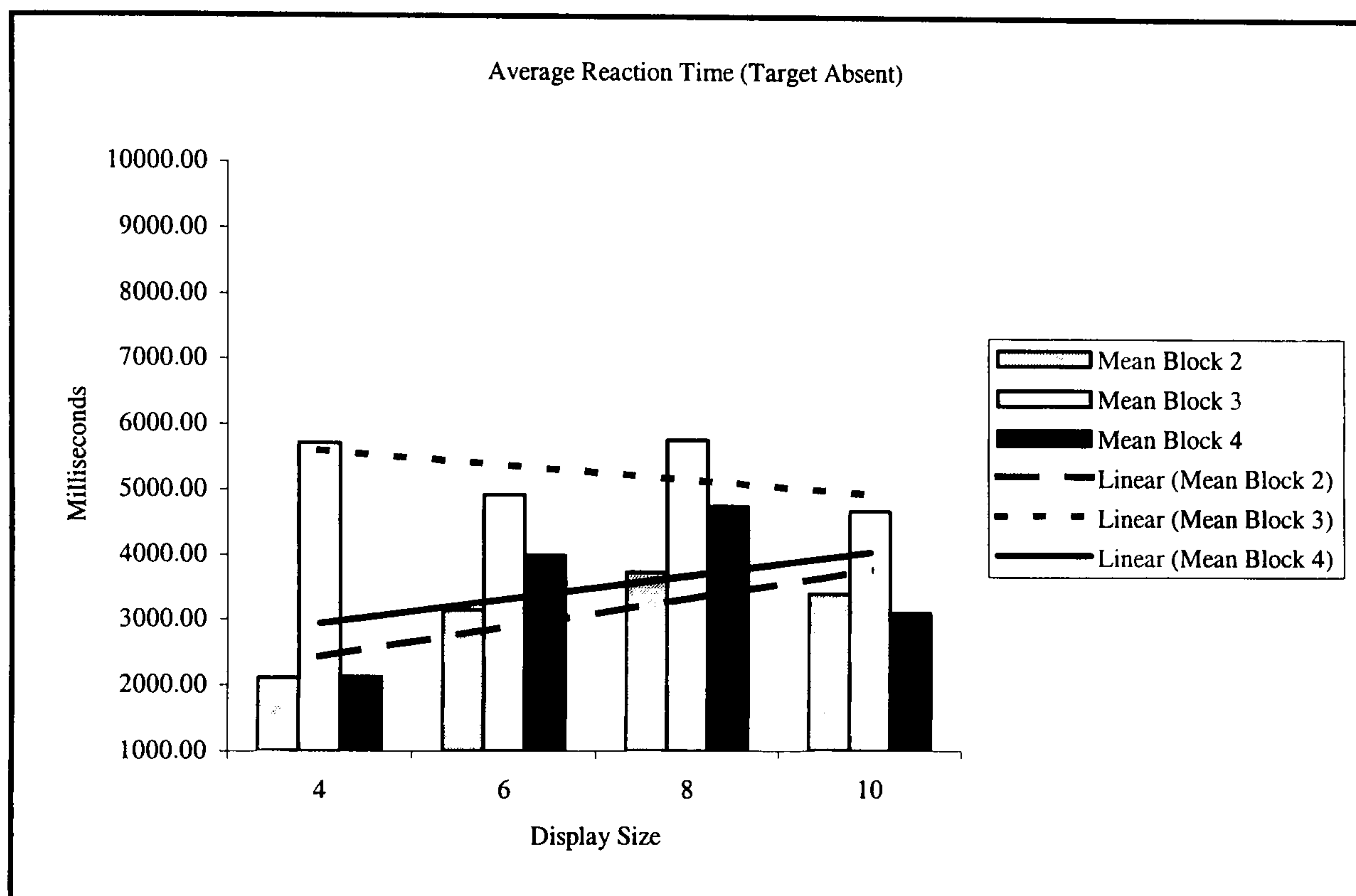
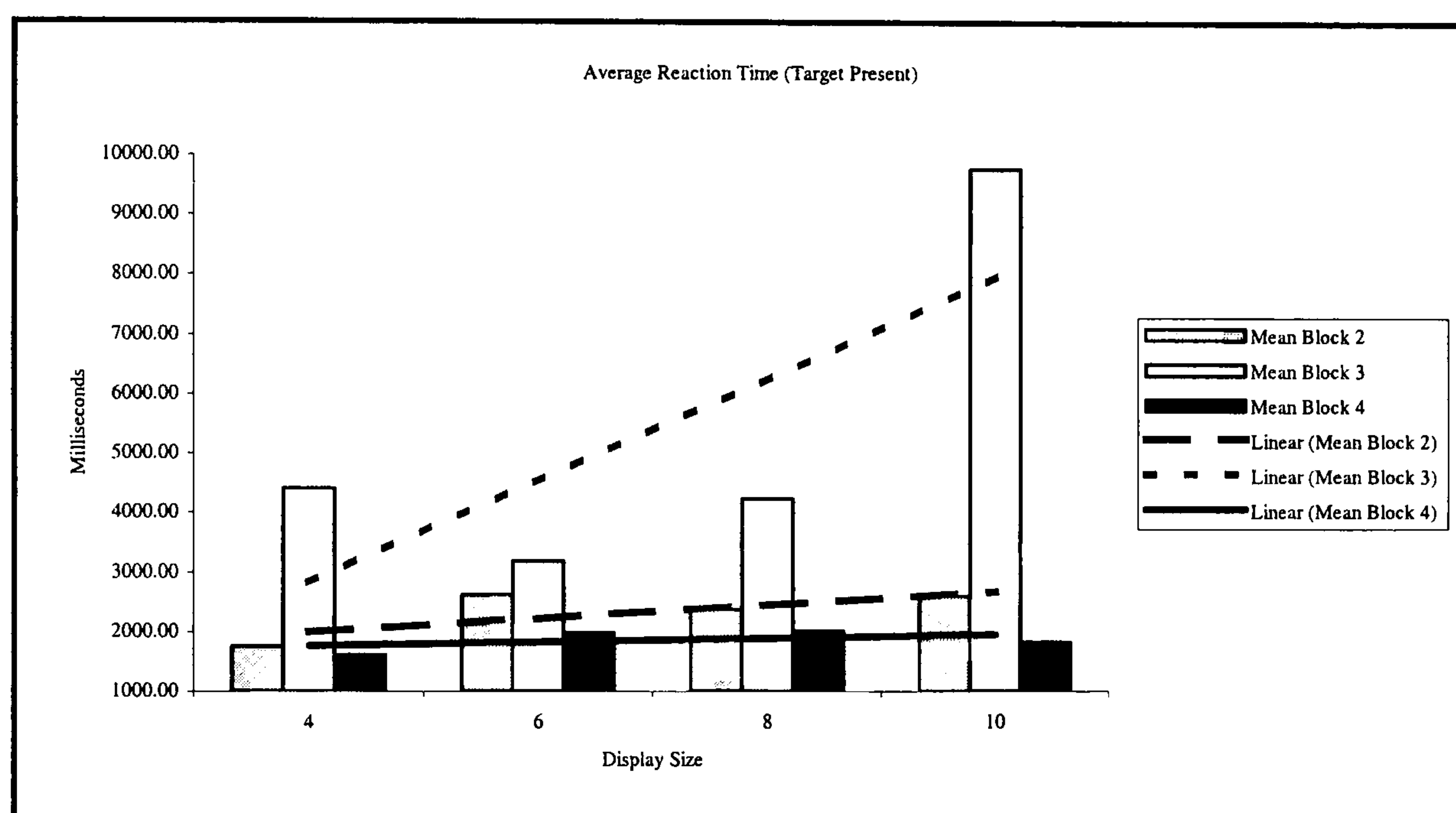


Figure 1 shows the positive slopes for reaction times as they increase with display size in blocks 2 and 4. However, block 3 shows a negative slope, suggesting that reaction times decrease with increased display sizes. This negative slope may be due to the reaction times of one participant, who had extremely elevated reaction times within block 3, for both the absent and present conditions. His average reaction times were 17708 and 10926 milliseconds for the absent and present conditions respectively.

Figure 2 demonstrates the significant positive slope associated with reaction times in block 3 (857.9). The slopes of blocks 2 and 4 suggest that reaction time does increase with display size, but that this effect is far stronger in block 3, as evidenced by the slope in the graph.

**Figure 2:** Mean reaction times for each block and display size – Present targets



### 3.2 Error rate

Summary table 2 includes average scores for errors, reaction times and GSR for each participant across each block. Examination of error rates across the three blocks, shows that error rate is highest in block 3, with four participants obtaining an error rate greater than or equal to 25%, and no participants achieving a 100% correct response rate. Comparisons between the identical blocks 2 and 4, show that error rate is the lowest in block 2, where six of the seven participants achieved 100% correct response rate. Conversely, in block 4, more errors are made than in



block 2, despite obvious practice effects, with error rates of participants 1 and 3 increasing in block 4.

<b>Table 2: Summary of impulsivity scores, reaction times, errors and GSR scores for all participants</b>											
	<i><b>DII</b></i>		<i><b>Block 2</b></i>			<i><b>Block 3</b></i>			<i><b>Block 4</b></i>		
Ppt.	Dys	Func	%errors	RT	GSR	%errors	RT	GSR	%errors	RT	GSR
1	4	4	0	1615.19	0.02	25	1916.67	0.18	12.5	1410.63	0.16
2	9	3	0	2134.31	0.06	59.3	4881.58	0.13	0	1883.56	0.14
3	8	5	0	2428.13	0.25	25	3270	0.2	6.2	3854.06	0.23
4	8	4	19.7	3077.38	0.36	33.3	3074.33	0.43	18.7	2718.56	0.24
5	5	4	0	2100.56	0.25	25	3761.42	0.44	0	2202.56	0.25
6	3	2	0	3109.38	0.49	8.3	4648.08	0.43	0	3120.06	0.38
7	6	5	0	4732.69	0.12	16.7	14844.5	0.05	6.2	3857.94	0.07
<b>Mean</b>	6.14	3.86	<b>2.81</b>	<b>2742.52</b>	<b>0.22</b>	<b>27.51</b>	<b>5199.51</b>	<b>0.27</b>	<b>6.23</b>	<b>2721.05</b>	<b>0.21</b>

### 3.3 Impulsivity

Table 2 shows individual participants scores for the dysfunctional and functional scales of the Dickman Impulsiveness Inventory (DII). Regarding the dysfunctional scale, all men scored above the mean (2.84 - SD2.97), with 3 participants scoring approximately 2 standard deviations above the mean. Conversely, functional impulsivity scores were all below the mean (6.27 - SD 2.92). Mean scores are derived from a previous Principal Components analytic study (Miller et al., 2003).

Due to the small sample size, the current study was unable to group the participants into high or low functional and dysfunctional impulsivity groups. However, the current mean data suggests that all the participants form one group of high dysfunctional and low functional impulsivity.

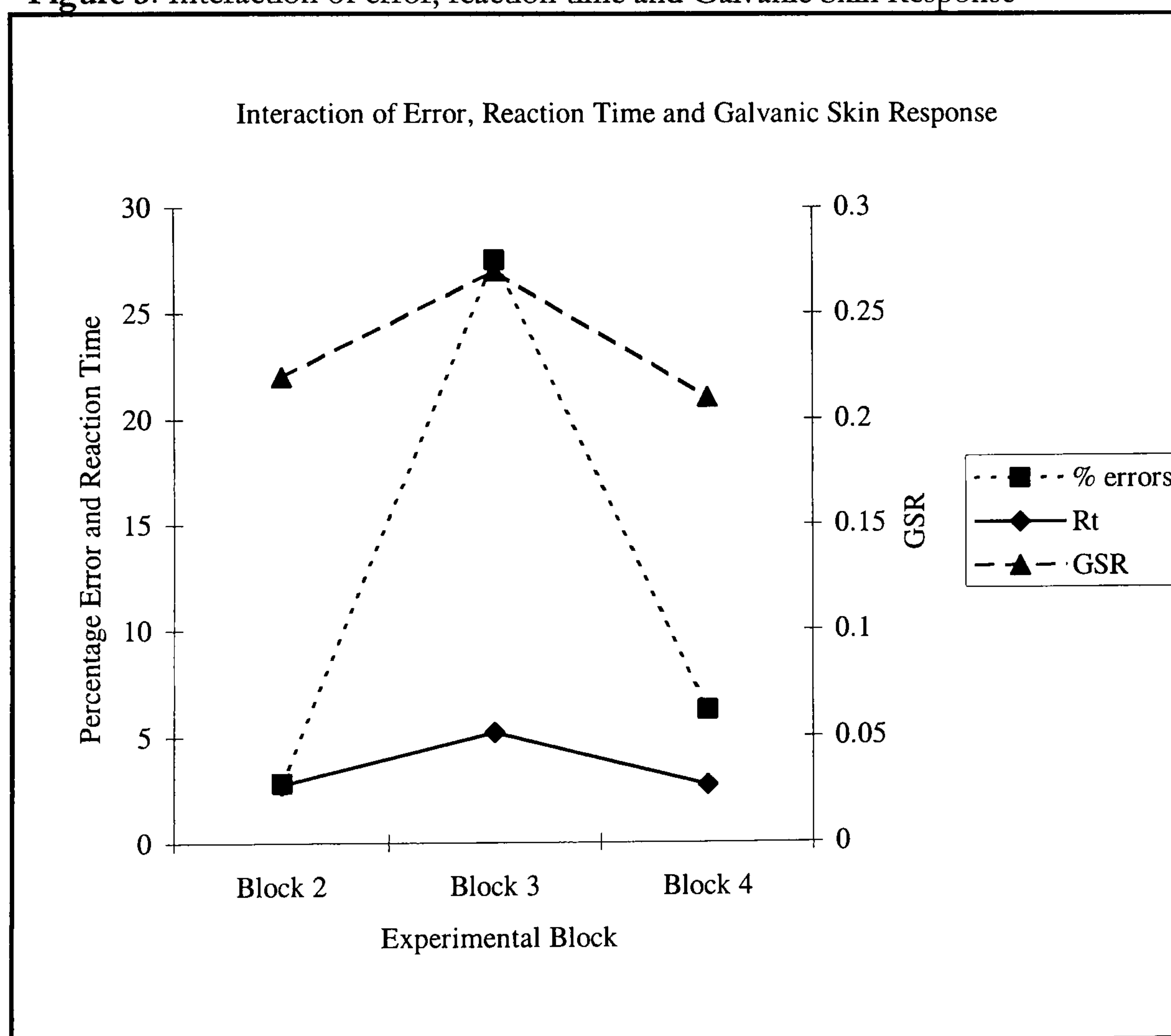
It can be seen from table 2 that higher error rates are related to higher scores of dysfunctional impulsivity. The participants who have the highest dysfunctional impulsivity (8, 9), made a substantial number of errors in all blocks, especially block

3. In comparison to the other participants, participant 6 has low dysfunctional and functional impulsivity scores. This may reflect aspects of an organic syndrome or specific elements of a developmental delay. Overall, the data in table 2 suggest no clear relationship between level of impulsivity and either reaction time or galvanic skin response.

### 3.4 Arousal

Figure 3 shows the interaction of arousal, reaction time and error rate.

**Figure 3:** Interaction of error, reaction time and Galvanic Skin Response



Examination of arousal rates in table 2 suggests there are only slight differences in galvanic skin response between the three blocks, showing only a small increase in the sexual block.

None of the participants showed notable changes in their arousal rates throughout testing. However, for each participant the sensitivity of the meter was set at 1, indicating high levels of arousal. It therefore seems that each participant was highly aroused prior to and throughout testing.

Figure 3 shows the positive relationship between arousal, reaction time and error rate. The graph indicates that as arousal increases, there is a related increase in reaction time and error rate. The graph also demonstrates how all three factors increase in block three and subsequently decrease during block 4.

#### **4. Discussion**

The findings suggest that, in the current sample of highly impulsive males, both error rate and reaction time increase when the individual is presented with sexual stimuli. The findings also demonstrate a slight increase in arousal during the presentation of these stimuli. This suggests that arousal is associated with a reduction in cognitive performance, measured in the current study by increased error rate and reaction times.

Although tentative results, the current findings fail to support Dickman's theory of Attentional-fixity, which suggests that arousal will improve the performance of high impulsives in an attention-demanding task. More specifically, Dickman proposes that by increasing arousal to an optimal performance-related level, cognitive performance measures such as error rates and reaction times will decrease.



Dickman's theory postulates that highly impulsive individuals tend to have difficulty fixing their attention on a stimulus. However, arousal increases their ability to fix their attention sufficiently, and also shift attention to another source of input.

The findings suggest that the males in the study were able to fix their attention on the sexual stimuli, but also that they experienced difficulty shifting their attention from the sexual stimuli, suggesting they became too fixated on the images. This hypothesis is supported by the substantially longer reaction times and increased error rates in the sexual block.

The current findings are in accord with several other studies which have investigated the interaction of attentional focus and sexual arousal. Wright & Adams (1999) studied the effects of erotic stimuli on cognitive processes in a reaction time task among heterosexual and homosexual men and women. They found that the presentation of erotic stimuli of the preferred gender influenced cognitive processes, as measured by slower reaction times.

Koukounas & Over (1999) studied the effects of sexual arousal (measured by penile tumescence) on attentional focus, in a timed reaction task, where participants reacted to a tone whilst watching erotic stimuli. Similarly, the study found that higher sexual arousal was associated with slower reaction times.

Another theory similar to that of Dickman, which highlights the relationship between arousal, impulsivity and performance, has been proposed by Eysenck (1993), who considered that the relationship between arousal and performance is closely linked to Yerkes-Dodson arousal curve (Yerkes & Dodson, 1908). Like

Dickman, Eysenck postulates that high impulsives are chronically low in arousal, but that arousal can be shifted up to an optimal level, whereas the performance of low impulsives is hindered, as already high arousal shifts beyond the optimal point.

It is considered from the findings that all the men in the current study were highly aroused throughout the testing procedure, which may explain the consistently elevated arousal GSR readings throughout testing. The fact that error rate and reaction time increased with the presentation of sexual stimuli, suggests that arousal did in fact reduce performance by exceeding an optimal level. Given the sexual nature of the current participants offending patterns, it is also possible that the participants were also sexually aroused throughout the experimental sessions.

The current findings may suggest two things; Firstly they indicate that the theories of Dickman and Eysenck are incorrect, and that either arousal does not improve cognitive performance per se, or that excessive levels of arousal beyond the optimal level can hinder the performance of highly dysfunctional individuals.

Secondly, they suggest that studies which examine sexual arousal, impulsivity and performance (e.g. Koukounas & Over, 1999; Wright & Adams, 1999), are investigating a fundamentally different type of arousal than that which Dickman and Eysenck refer to. Indeed, Dickman did differentiate between energetic and tense arousal (Thayer, 1978), suggesting that it was energetic arousal which interacted with impulsivity and performance (Dickman, 2000). It may be the case that sexual arousal could be likened to tense arousal, which may explain the presentation of the participants during testing, who mostly appeared physically tense and agitated. However, it is not clear whether the arousal observed in the participants was either



sexual arousal or anxiety, as the two clearly are not a unitary phenomenon.

Confusion increases when one thinks of sexual arousal as a drive, which would be assimilated to energetic and an adrenaline associated arousal. These findings re-emphasise the importance of recognising what type of arousal is being measured, but also demonstrate that theories of impulsivity, arousal and performance may be limited to specific types of arousal.

The current findings also fail to support views that sexual offenders are generally a highly impulsive group (Douglas, Burgess, Burgess & Ressler, 1992; Prentky, Knight, Lee & Cerce, 1995), based on the hypothesis that highly impulsive individuals struggle to fix their attention on a source of input, but can shift attention rapidly. Findings like this have been replicated in other groups often associated with high levels of impulsivity, such as violent offenders, who in a cognitive task, were found to be deficient in shifting attention from one task to another (Bergvall, Wessely, Forsman & Hansen, 2001). Similarly, alcoholics are often deemed an impulsive group, and would be expected to have difficulty fixing their attention. It is possible that a similar visual search task to the current study, using alcoholic stimuli, would suggest that alcoholics are distracted by such images and dwell or become fixated in the same way that sexual offenders do on sexual stimuli.

#### *Study Limitations and future research directions*

Owing to unexpected changes in administrative and security procedures following the implementation of the Tilt report (2000) recommendations occurring at the beginning of the data collection phase, the study could not proceed at the original site. As such, participants had to be sought from a different site and, consequently, a fresh approval from the Local Research Ethics Committee and Hospital Research



Ethics Committee had to be sought. The result of these factors was a considerably reduced sample size that negates effective use of quantitative statistics such as multiple regression analysis. In such a small sample, outlier scores, such as that of one participant in the current study, can easily reverse the linear slope of scores, suggesting a different pattern to the results. With a larger pool of respondents, such scores could be accounted for by overall variance.

In terms of the design methodology, the visual search task had a number of limitations which reduce the validity of the findings. Firstly, a future study would benefit from more trials in each block. Ideally, it is considered that there should be approximately 20 trials for each condition, i.e. display size vs. present/absent target. In the current study this would mean the presentation of around 160 trials, which would take a significantly longer period, an important factor to consider when working with psychiatric inpatients. Secondly, not all of the trials were matched, resulting in difficulties when drawing averages from the data.

Given the difficulties with securing a baseline galvanic skin response for each of the participants, and the problems monitoring the GSR whilst observing the visual search task, it is considered that a computerised measure of arousal would be beneficial for use in future testing. This would provide continuous data, which is more accurate and provides average responses for each trial and block.

## **Conclusions**

This study piloted a computerised visual search task, demonstrating its application to assess the impulsivity construct, with particular potential use among sexual offenders. Whilst the author recognises the limitations of the current study there

are several key implications which can be drawn from the study. Firstly, the findings do not support Dickman's theory of Attentional fixity (Dickman, 1993, 1996) that increases in arousal will improve individual performance in a cognitive task among highly impulsive individuals. The current study suggests the opposite phenomenon; that when presented with sexual stimuli, arousal increases and consequently, performance level actually decreases, as evidenced by increased error rate and reaction time. The findings also support the idea that sexual offenders become fixated and distracted by sexual stimuli, which clinically, might explain why many act in a behaviourally impulsive manner, often demonstrating a failure to think of the consequences of their actions.

## References

- Anderson, K. J., & Revelle, W. (1983). The interactive effects of caffeine, impulsivity and task demands on a visual search task. *Personality and Individual Differences*, 4, 127-134.
- Bergvall, A. H., Wessely, H., Forsman, A., & Hansen, S. (2001). A deficit in attentional set-shifting of violent offenders. *Psychological Medicine*, 31, 1095-1105.
- Dickman, S. (1985). Impulsivity and perception: Individual differences in the processing of the local and global dimensions of stimuli. *Journal of Personality and Social Psychology*, 48, 133-149.
- Dickman, S. (1990). Functional and dysfunctional impulsivity: personality and cognitive correlates. *Journal of Personality and Social Psychology*, 58, 95-102.
- Dickman, S. (1993). Impulsivity and information processing. In W. McCown, M. Shure, & J. Johnson, *The impulsive client: theory, research and treatment*. Washington, DC: American Psychological Association.
- Dickman, S. (1996). Adverse (and beneficial) consequences of impulsivity. In R. S. Feldman, *The psychology of adversity*. Amherst, MA: The University of Massachusetts Press.
- Dickman, S. (2000). Impulsivity, arousal and attention. *Personality and Individual Differences*, 28, 563-581.



Douglas, J. E., Burgess, A. W., Burgess, A. E., & Ressler, R. K. (1992). *Crime Classification Manual: A standard system for investigating and classifying violent crimes*. New York: Lexington Books.

Easterbrook, J. A. (1959). The effect of emotion on cue utilization and the organisation of behaviour. *Psychological Review*, 66, 183-199.

Eysenck, H. J. (1993). The nature of impulsivity. In W. McCown, M. Shure, & J. Johnson, *The impulsive client: theory, research and treatment*. Washington, DC: American Psychological Association.

Eysenck, H. J. & Eysenck, S. B. G. (1977). The place of impulsiveness in a dimensional system of personality description. *British Journal of Social and Clinical Psychology*, 16, 57-68.

Gerbing, D. W., Ahadi, S. A., & Patton, J. H. (1987). Toward a conceptualisation of impulsivity: Components across the behavioral and self-report domains. *Multivariate Behavioral Research*, 22, 357-379.

Harkins, S., & Geen, R. G. (1975). Discriminability and criterion differences between extraverts and introverts during vigilance. *Journal of Research in Personality*, 9, 335-340.

Ingling, N. W. (1972). Categorization: A mechanism for rapid information processing. *Journal of Experimental Psychology*, 94, 239-243.

- Jonides, J., & Gleitman, H. (1976). The benefit of categorisation in visual search: target location without identification. *Perception and Psychophysics*, 20, 289-298.
- Koukounas, E. & Over, R. (1999). Allocation of attentional resources during habituation and dishabituation of male sexual arousal. *Archives of Sexual Behavior*, 28, 539-552.
- Malle, B. F. & Neubauer, A. C. (1991). Impulsivity, reflection, and questionnaire response latencies: No evidence for a broad impulsivity trait. *Personality and Individual Differences*, 12, 865-871.
- Mathias, C. W., & Stanford, M. S. (2002). Impulsiveness and arousal: heart rate under conditions of rest and challenge in healthy males. *Personality and Individual Differences*, In Press.
- Matthews, G. (1987). Personality and multidimensional arousal: a study of two dimensions of extraversion. *Personality and Individual Differences*, 8, 9-16.
- Miller, E., Joseph, S., & Tudway, J. (2003). Impulsivity: Assessing the Component Structure of four Self-Report Measures. Unpublished D.Clin.Psy. Manuscript, Universities of Coventry and Warwick.
- Parker, J. D. A., Bagby, R. M., & Webster, C. D. (1993). Domains of the Impulsivity Construct: A factor analytic investigation. *Personality and Individual Differences*, 15, 267-274.

Prentky, R. A., Knight, R. A., Lee, A. F., & Cerce, D.D. (1995). Predictive validity of lifestyle impulsivity for rapists. *Criminal Justice and Behavior*, 22, 106-128.

Revelle, W. (1987). Personality and motivation: sources of inefficiency in cognitive performance. *Journal of Research in Personality*, 21, 436-452.

Tarchanoff, J. (1889). Décharges électriques dans le peau de l'homme sous l'influence de l'excitation des organes des sens et de différentes formes d'activité physique. *C. R. Soc. Biol. (Paris)* 41: 447-451.

Thayer, R. (1978). Factor analytic and reliability studies on the Activation-Deactivation Adjective Check List. *Psychological Reports*, 42, 747-756.

Tilt, R. (2000). The Review of security at the High Security Hospitals. Department of Health, UK. May 2000.

Treisman, A. M., & Gelade, G. (1980). A feature-integration theory of attention. *Cognitive Psychology*, 12, 97-136.

Wright, L. W. Jr., & Adams, H. E. (1999). The effects of stimuli that vary in erotic content on cognitive processes. *Journal of Sex Research*, 36, 145-151.



## **Chapter IV - Reflective review**

**Further discussion and reflections on the research  
process**

## **Abstract**

This reflective paper explores issues raised throughout the course of the research process. Ethical issues highlighted during the main paper data collection are discussed, followed by personal reflections on the methodological implications related to the use of psychometrics. Finally, the current paper explores further conceptual aspects of impulsivity that have raised many questions and talking points.

## **Ethical issues in research with mentally disordered offenders**

The process of obtaining ethical consent for the brief paper, highlighted the increasing restrictions associated with accessing this client group, particularly when the research relates to sexual issues in a learning disabled sexually offending sample. Such restrictions played a significant role in attempts to gain ethical approval for the study from a maximum security hospital, a process which lasted some five months. Despite receiving approval, further restrictions were put in place following the implementation of the Tilt Report (2000), documented to improve security provision across the maximum security hospitals. These factors meant that a different site needed to be obtained and further ethical approval obtained. Consequently, the data collection for the brief paper was extremely restricted, and methodological problems which arose during the collection of data could not be rectified, as would be possible where time is less pressured. Clearly, these factors have played a critical role in the current research process, and highlight the increasing difficulties in accessing certain client groups.

Given the ethical issues of conducting research with mentally disordered offenders, extra care was taken to ensure that consent was obtained in a manner that ensured that each participant was thoroughly informed of the testing process, and that the methodology itself was designed to be accessible for the sample. However, despite these efforts, several factors became apparent during the data collection process, which raised my concern regarding informed consent, understanding, and the impact of these factors upon the validity of the findings.

Observations of participant's behaviour upon entering the room for testing suggested that each was highly anxious. Many of the participant's displayed



behaviour such as rapid speech, fidgeting, avoiding eye contact, and physiological indicators such as their galvanic skin response and sweating reinforced observations.

Within the testing procedure, we had anticipated that some participants may be anxious and had attempted to control for this factor by having nursing staff in the room as extra support, allowing time to go over consent and give time for questions, and incorporating practice sessions within the testing programme. This did seem to have a positive effect on all the participants, and based on observable behaviour, their anxiety did appear to subside. However, it was clear from physiological indicators that arousal, based on galvanic skin response readings, was elevated for all the participants throughout testing.

This raised a number of ethical and safety issues for myself and the participants. Firstly, in relation to the heightened anxiety of the participants, it was unclear whether this affective response was related to sexual arousal, if at all. It is possible that the arousal pattern of each participant was increased due to the anticipation of observing human body parts as well as being seen by a female researcher. Studies have shown that sexual arousal responses of sexual offenders are both more elevated and take longer to subside, when they are tested by a female, rather than a male (Adler, 1995). It is also notable from this study that participants reported feeling more anxious than those participants tested by a male. Based on these factors and the sexual nature of the current participant's offending patterns, it is likely that the participants were sexually aroused throughout the experimental sessions.

This raises a fundamental issue of placing such individuals in a situation where they are likely to become sexually aroused and have an increased risk of displaying sexually aggressive behaviour whilst in a disinhibited state. Issues around my safety had been addressed, both in the seating plan, presence of nursing staff, and an alarm system, these factors also serving to protect and support each participant. It was also discussed with nursing staff, that key staff members would be available after testing if participants were observed to be highly anxious or sexually aroused.

A second area of concern was participants' understanding of the testing procedure, in particular the questions on the Dickman Impulsiveness Inventory. This concern is based on findings that reading difficulties, such as dyslexia, are significantly higher among prison and psychiatric populations (Klinge & Dorsey, 1993; Rasmussen. Almvik & Levander, 2001).

Prior to testing, the reading level of the questions contained in the inventory was assessed using the Flesh Reading Ease formula (Flesch, 1948). The formula uses words, syllables and sentence length to derive a score in the range of 0 (practically unreadable) to 100 (easy for any literate person). Whereas most questions had a high reading ease, some questions had scores of 34.2, such as 'I am good at taking advantage of unexpected opportunities, where you have to do something immediately or lose your chance'. To control for individual differences in reading ability, I read all the questions to each participant as well as presenting them with the questions in large print.

Given the IQ of the participants (WAIS-III FSIQ 62-68), it was anticipated that their reading level may cause some difficulties in their understanding of the more

complex questions. Indeed, this was apparent during testing, resulting in many of the questions, (often the same ones) being explained and examples given. However, by simplifying the questions, it was clear that the items were being changed, thus affecting the content validity of the scale.

There clearly is a difficulty obtaining both psychometric validity and ensuring that the participants understand the questions. As an assistant and trainee clinical psychologist I have observed an alarming tendency of clinicians to modify standardised questionnaires for the population in use. Words in items are often removed or simplified, the layout of questionnaires altered, and even the font changed to 'arial' which I am informed is more readable to those with reading difficulties, the empirical testing of which I have unfortunately never read. These efforts to amend test items to make them more readable suggests that readability needs increased consideration when the test is originally developed, particularly as the clinical application of such tools is primarily among those populations most likely to have reading difficulties.

### **Rethinking the utility of self-report assessment tools**

The findings from the main paper provided some extremely useful insight into the use of psychometric tests and acceptance of their results. For many clinicians who frequently incorporate psychometrics as part of their assessment protocol, the findings that four self-report measures of impulsivity, were in fact measuring a different construct, may be quite alarming.

As an Assistant Psychologist I too was one of these clinicians who tended to use psychometrics on a weekly basis to form part of an admission assessment to a local



secure unit. The study has raised some extremely important issues, guiding my future use of psychometrics.

Firstly, the findings highlighted the importance of examining the validity of the psychometrics we employ as clinicians. As experts in the use of such tools we have a duty to question what exactly we are measuring and of course what the psychometric does not measure. Examining four self-report measures of impulsivity, I was surprised to find that some well-known and widely used tests have weak subscales (e.g. BIS-11, Patton, Stanford & Barratt, 1995), and that factor analytic studies which claim to replicate their factor structure, can often themselves be flawed in their methodology (White et al., 1994).

Using a measure where the psychometric properties are in doubt can have strong implications for the client. Results may be over inclusive, suggesting the client has traits they do not necessarily have. Conversely, measures that only examine a narrow facet of a construct may underestimate the difficulties a client is experiencing, thereby preventing the necessary intervention they require.

Secondly, the lack of convergence between the measures and their underpinning theories, demonstrates how clinicians and other health practitioners may differ in their definition of a construct. Having worked in forensic environments, impulsivity is a term that is frequently used, and is often associated with increased risk of offending behaviour, hence one factor that can weigh heavily upon clinical decision-making. It is likely that each multi-disciplinary worker has a different understanding of impulsivity, which of course is representative of the lack of clarity in the literature.

Reflecting upon the research process, it is notable how significantly my understanding of the impulsivity construct has changed, having initially been quite confident of the rather specific definition I applied to it. Of concern is that many other health professionals have confidence in their understanding of the construct, each definition being different from the next.

I currently view impulsivity as an umbrella term, with multiple manifestations and applications. Rather than this ambiguity being a source of concern, I see my current unassuming position allows for continued questioning of the construct and its measurement, as well as other clinical entities. Recognising that impulsivity is less specific than I originally believed, in addition to increased knowledge regarding the validity of psychometrics, highlights the need for me as a clinician to adopt a responsible role in their use. I now feel it is critical to question exactly what we are measuring, within the context of the individual being assessed, and as part of a broad based assessment. Additionally, I feel strongly that our clinical duty to clients is such that we regulate our use of psychometrics and do not become over zealous in their application, particularly those over which there exist questions as to their validity.

#### **Further reflections on the concept of impulsivity.**

Like many other theorists of impulsivity, Dickman (1990) argues that impulsivity is dependent upon the environment in which it occurs. On this basis, we all have the potential, even the most cautious among us, to act in an impulsive manner if the situation requires us to, such as in an emergency.

The hypothesis that people can act in different ways depending on the situation, was demonstrable when people returned the self-report impulsivity questionnaires to me, commenting on how difficult it was to respond in a yes/no format to certain questions. A particular example of this was a group of intensive care nurses from a children's hospital, who felt that in some situations they may act impulsively, whereas generally they tended to be cautious, thoughtful individuals. They considered that at work they are 'forced' into making what they consider to be quick, 'impulsive' decisions in order to help the patients.

Overtly, this seems to be what Dickman refers to as functional impulsivity, when this group of nurses respond quickly and apparently without much thought, this style being optimal, or a life may be lost. However, after much thought, it became less clear as to whether this group are functionally impulsive in their work.

Dickman specifies that functional impulsivity relies upon the cost of an error being low, hence in the case of the nurses and indeed other emergency workers who rely heavily on making split-second decisions, an error may result in a life being lost.

On this basis, I would argue that rather than their behaviour being impulsive, the nurses behaviour in emergency or pressured situations, is in fact based on measured decision making and intellectual consideration, facilitated through knowledge and training. Such behaviour is similar to that of heuristic knowledge or a learned response, like that of driving behaviour, which many individuals automatically carry out with little ability to unpack or recognise the decision making processes involved in that behaviour. Such rapid automatic responses from this group of normally cautious individuals in emergency situations explains why they may believe



themselves to be impulsive and of course explains their surprise at their apparent change in behaviour.

Conceptually, this raised an important issue regarding individual response in an emergency. The above suggests individuals can be trained to respond to certain emergencies in a given way. However, clearly in a different situation, such as a car losing control, the nurse may not respond in such an adaptive manner - or would they? Most impulsivity theorists (Barratt, 1985; Dickman, 1990; Eysenck & Eysenck, 1985) would agree that in an emergency (for which they are not trained) most individuals will respond in an impulsive manner.

This led me to think whether all individuals do in fact respond in a similar impulsive manner when faced with a life-threatening situation. My thoughts were related to individual responses to losing control of a vehicle, and would different people respond in a similar manner. Whereas theorists would argue that in this situation individuals are forced to respond in an impulsive manner, I believe that such responses can be differentiated into those who take positive action versus those who respond in a negative manner. For instance, when faced with a car losing control on a corner, some may make the decision to accelerate, thereby potentially taking positive action to get out of the life-threatening situation. Other individuals may freeze or take other escaping action such as braking hard, both of which inevitably could worsen the possible outcome.

This heightened my belief that impulsivity is mediated by anxiety, and that the arousal systems of the fight and flight systems, lead to either the positive and

controlled action of the fight system, compared to the disorganised, over aroused flight system, the latter which is manifested as impulsiveness.

## **Conclusions**

Ending a doctoral thesis by arguing that impulsivity is an umbrella term, may seem to be a non-descript conclusion to make. However, such a broad term is deemed necessary when one considers that impulsivity is related to all aspects of the personality system, manifests itself in many ways, and lacks a clear definition.

Such a conclusion seems a long way from the specific definable concept I once thought I knew, and is a key learning from the research process. With the knowledge that impulsivity is less specific than I thought, comes a wide range of unanswered questions and areas of exploration, which form the basis for future research.

## References

- Adler, J. M. (1995). The effect technician gender has on sexual arousal responses of male sexual offenders. *Dissertation Abstracts International: Section B: The Sciences and Engineering*. 55 (7-B) 3054.
- Barratt, E. S. (1985). Impulsiveness defined within a systems model of personality. In C. D. Spielberger & J. M. Butcher (Eds.), *Advances in personality assessment* (Vol. 5, pp. 113-132). Hillsdale, NJ: Erlbaum.
- Dickman, S. J. (1990). Functional and Dysfunctional Impulsivity: Personality and Cognitive Correlates. *Journal of Personality and Social Psychology*, 58, No. 1, 95-102.
- Eysenck, H. J. & Eysenck, S. B. G. (1985). *Personality and individual differences*. New York: Plenum Press.
- Flesch, R. (1948). A new readability yardstick. *Journal of Applied Psychology*, 32, 211-233.
- Klinge, V. & Dorsey, J. (1993). Correlates of the Woodcock-Johnson Reading Comprehension and Kaufman Brief Intelligence Test in a forensic psychiatric population, *Journal of Clinical Psychology*, 49, 593-598.
- Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology*, 51, 768-774.



Tilt, R. (2000). The Review of security at the High Security Hospitals. Department of Health, UK. May 2000.

White, J. L., Moffitt, T. E., Caspi, A., Jeglum-Bartusch, D., Needles, D. J., & Stouthamer-Loeber, M. (1994). Measuring Impulsivity and Examining Its Relationship to Delinquency. *Journal of Abnormal Psychology*, 103, 192-205.

## Appendices

## APPENDIX A

Northampton 

Primary Care Trust

**Northampton Medical Research/Ethics Committee**

Chairman: Dr Robin Sheppard

Administrator: Mrs Michelle Spinks ☎ (01604) 615363

Our Ref: RS/MS/03/35

8 April 2003

Dr Jeremy Tudway  
Consultant Forensic Clinical Psychologist  
Clinical Psychology Doctoral Programme  
Coventry University  
Priory Street  
COVENTRY

Dear Dr Tudway

**03/35 A pilot study using a cognitive paradigm to test Dickman's Attentional Fixity Theory (1993, 1996) of impulsivity among a UK sexual offending population**

The Chairman of the Northampton Medical Research/Ethics Committee has considered the amendments submitted in response to the Committee's earlier review of your application on 13 March 2003, as set out in our letter dated 17 March 2003. The documents considered were as follows:

- E-mail from Jeremy Tudway to Michelle Spinks dated 18 March 2003
- Addressing potential points of harm to Ms Miller
- Consent form
- Address form
- Information about the study
- Arousal and informed consent

The Chairman, acting under delegated authority, is satisfied that these accord with the decision of the Committee and has agreed that there is no objection on ethical grounds to the proposed study. I am therefore pleased to confirm that Formal Ethical Approval has been granted.

I confirm that the Northampton Medical Research/Ethics Committee operates according to Good Clinical Research Practice (GCP) principles, and enclose a copy of the Committee's Constitutions and Standing Orders.

You will find details enclosed regarding a Regional funded project to record and analyse projects that have been submitted to this Ethics Committee. The letter enclosed explains the project in more detail. Please take time to read it, before completing the survey. Your participation is useful and necessary to the completion of a mapping exercise of research (any research) that is proposed, planned or taking part in Northamptonshire. Your record

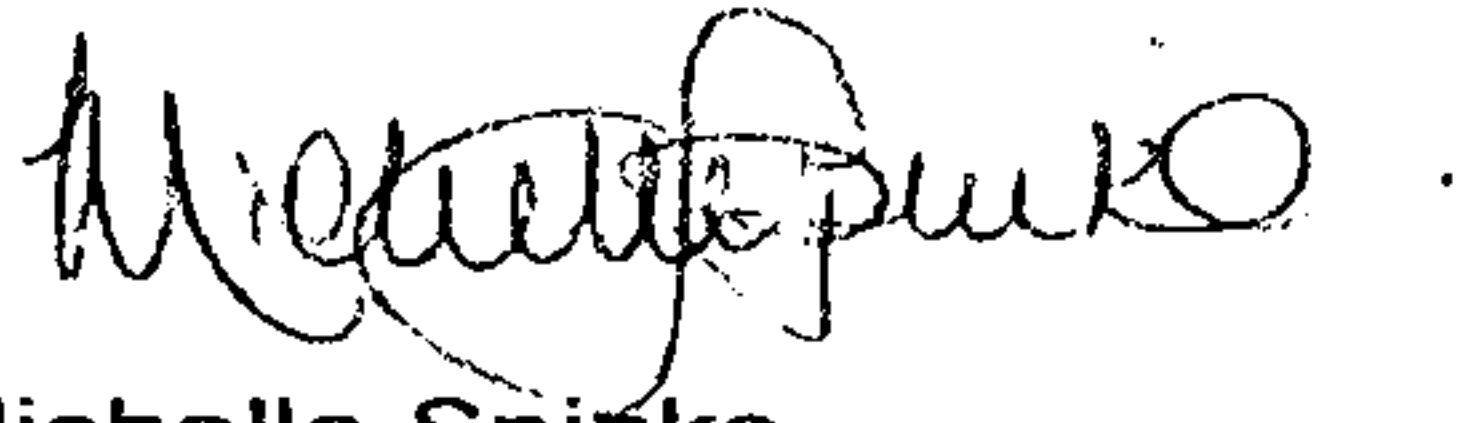


of using resources would be helpful in shaping future funding of research and development in the county.

To complete our records regarding the project, please complete and return the form accompanying this letter.

Please let me know if the study has to be terminated or any ethical considerations arise which need to be discussed further by the Committee.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Michelle Spinks', with a stylized flourish at the end.

Michelle Spinks  
Administrator, Northampton Medical Research/Ethics Committee

## **Appendix B - Notes for Authors**

- Personality and Individual Differences**
- Journal of Personality Assessment**
- Journal of Interpersonal Violence**

# PERSONALITY AND INDIVIDUAL DIFFERENCES

---

## *Information for Contributors*

*Personality and Individual Differences* will be published monthly with additional issues in January, April, July and October—2 volumes/annum.

Neither the Editors nor the Publisher accept responsibility for the views or statements expressed by authors.

All incoming papers are subject to the refereeing process, unless they are clearly not appropriate for the "Aims and Scope" of the Journal as outlined on p. ii. Correspondence regarding decisions reached by the editorial committee is not encouraged. An explanation of our editorial policies will be found in the Editorial in the first issue of the Journal.

This Journal should be cited in lists of references as *Personality and Individual Differences*.

### *Manuscripts*

Manuscripts submitted for publication and all scientific correspondence, should be sent to: Professor G. H. Gudjonsson, Institute of Psychiatry, De Crespigny Park, Denmark Hill, London SE5 8AF (email: spjtghg@iop.kcl.ac.uk).

Manuscripts should be typewritten on one side of the paper, *double spaced* and in quadruplicate (one original and three copies). Manuscripts should not usually exceed 5000 words. The original manuscript and diagrams will be discarded one month after publication unless the Publisher is requested to return original material to the author.

Manuscripts must be carefully checked and **corrections to the proofs must be restricted to printer's errors**. Any substantial alterations other than these may be charged to the author.

### *Disks*

Authors should submit a computer disk containing the final version of the paper along with the **final** manuscript to the editorial office. Please observe the following criteria:

1. Send only hard copy when first submitting your paper.
2. When your paper has been refereed, revised if necessary and accepted, send a disk containing the final version with the final hard copy. **Make sure that the disk and the hard copy match exactly.**
3. Specify what software was used, including which release, e.g. MS Word 2000.
4. Specify what computer was used (either IBM-compatible PC or Apple Macintosh).
5. Include the text file and separate table and illustration files, if available.
6. The file should follow the general instructions on style/arrangement and, in particular, the reference style of this journal as given below.
7. The file should be single-spaced and should use the wrap-around end-of-line feature, i.e. no returns at the end of each line. All textual elements should begin flush left; no paragraph indents. Place two returns after every element such as title, headings, paragraphs, figure and table call-outs.
8. Keep a back-up disk for reference and safety.

The articles submitted must contain original material which has not been published and which is not being considered for publication elsewhere. Papers accepted by *Personality and Individual Differences* may not be published elsewhere in any language without the consent of the Editors.

The title of the paper, the author's name and surname and the name and address of the institute, hospital etc. where the work was carried out, should be indicated at the top of the paper. The name and address of the author to whom correspondence and proofs should be sent must be given on the first page. Where possible, an **email address** and **fax number for the corresponding author** should be supplied with the manuscript, for use by the publisher.

*Summaries.* A summary, not exceeding 200 words should constitute the first page of the article.

*Key-Words.* To follow the Elsevier policy regarding the use of key-words to aid in the preparation of annual indexes and to help with retrieval of information by abstracting and indexing services, we are proposing to ask contributors for six to eight key-words to be added to the articles submitted to *Personality and Individual Differences*. APA has given a very lengthy descriptor list as an appropriate basis for key-words, but we feel that contributors would be able to decide on the basis of their own ideas about the relative importance of different aspects of the work to single out the most appropriate key-words without any such guidance.

*References* should be prepared using the *Publication Manual of the American Psychological Association* for style. They should be placed on a separate sheet at the end of the paper, double-spaced, in alphabetical order.



# PERSONALITY AND INDIVIDUAL DIFFERENCES

References should be quoted in the text by giving the author's name, followed by the year, e.g. (Hersen & Barlow, 1976) or Hersen and Barlow (1976).

For *more than two* authors, all names are given when first cited, but when subsequently referred to, the name of the first author is given followed by the words "et al." as for example—First citation: Nau, Caputo, and Borkovec (1974) but subsequently, Nau et al. (1974).

References to journals should include the author's name followed by initials, year, paper title, journal title, volume number and page numbers, e.g.

Singh, N. N. (1980). The effects of facial screening on infant self-injury. *Journal of Experimental Therapy and Experimental Psychiatry*, 11, 131–134.

References to books should include the author's name followed by initials, year, paper title, editors, book title, volume and page numbers, place of publication, publisher, e.g.

Hersen, M., & Barlow, D. H. (1976). *Single case experimental designs: Strategies for studying behavior change*. New York: Plenum Press.

or

Brownell, K. D. (1984). Behavioural medicine. In C. M. Franks, G. T. Wilson, P. C. Kendall, & K. D. Brownell (Eds), *Annual review of behavior therapy* (Vol. 10, pp. 11–20). New York: Guilford Press.

*Footnotes*, as distinct from literature references, should not be used unless there are very exceptional circumstances. If they are included, they should be indicated by the following symbols: \*, †, ‡, §, ||, ¶, commencing anew on each page.

*Illustrations and diagrams* should be kept to a minimum: they should be provided in camera ready form, suitable for reproduction without retouching. They should be numbered and marked on the back with the author's name. Captions accompanying illustrations should be typewritten on separate sheets.

Photographs and photomicrographs should be submitted unmounted and on glossy paper.

The following standard symbols should be used in line drawings since they are easily available to the printers:

△ ▽ ▲ ▼ ○ ● □ ■ ⊙ ⊕ ⊗ ⊖

Tables and figures should be constructed so as to be intelligible without reference to the text, each table and column being provided with a heading.

*Electronic artwork*. For specific information on the preparation of electronic artwork consult <http://www.elsevier.com/locate/authorartwork/>

*Tables*. Captions should be typewritten together on a separate sheet. The same information should not be reproduced in both tables and figures.

*Proofs*. Proofs will be sent to the author (first-named author if no corresponding author is identified on multi-authored papers) by PDF wherever possible and should be returned within 48 hours of receipt, preferably by e-mail. Corrections should be restricted to typesetting errors; any other amendments made may be charged to the author. Any queries should be answered in full. Elsevier will do everything possible to get your article corrected and published as quickly and accurately as possible. Therefore, it is important to ensure that all of your corrections are returned to us in one all-inclusive e-mail or fax. Subsequent additional corrections will not be possible, so please ensure that your first communication is complete. Should you choose to mail your corrections, please return them to: Log-in Department, Elsevier Science, Stover Court, Bampfylde Street, Exeter, Devon EX1 2AH, UK.

*Reprints*. Reprints may be obtained at a reasonable cost, provided that they are ordered when the proofs are returned and using the reprint order form which will accompany the author's proofs.

*Copyright*. All authors must sign the 'Transfer of Copyright' agreement before the article can be published. This transfer agreement enables Elsevier Science Ltd to protect the copyrighted material for the authors, but does not relinquish the author's proprietary rights. The copyright transfer covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations, and includes the right to adapt the article for use in conjunction with computer systems and programs, including reproduction or publication in machine-readable form and incorporation in retrieval systems. Authors are responsible for obtaining from the copyright holder permission to reproduce any figures for which copyright exists.

## Author enquiries

Authors can keep a track on the progress of their accepted article, and set up e-mail alerts informing them of changes to their manuscript's status, by using the "Track a Paper" feature of Elsevier's Author Gateway (<http://authors.elsevier.com>). The Author Gateway also contains detailed submission instructions, artwork guidelines and other author-related information. Contact details for questions arising after acceptance of an article, especially those relating to proofs, are provided when an article is accepted for publication.



## Notes for Authors

# Journal of Personality Assessment

The Official Publication of the Society for Personality Assessment

**Editor: Gregory J. Meyer**  
University of Alaska Anchorage

### **Editorial Scope**

The Journal of Personality Assessment primarily publishes articles dealing with the development, evaluation, refinement and application of personality assessment methods. Articles address theoretical, empirical, pedagogical, or professional aspects of using psychological tests, interview data, or the applied clinical assessment process to advance the understanding of personality processes, psychopathology, and overt behaviour. Articles addressing understudied areas in personality assessment are strongly encouraged. These include (a) systematic reviews or meta-analyses, (b) the process of effectively integrating nomothetic empirical findings with the idiographic requirements of clinical practice, and (c) the practical impact of the clinical assessment process on the individuals receiving services and/or those who refer them for evaluation. In addition, the journal welcomes (a) clinical case presentations that highlight the disciplined clinical reasoning and subsequent feedback discussions that form the bedrock between nomothetic research findings and clinical practice, (b) clearly written articles describing developments in statistical methods applicable to personality assessment, (c) comments that express a substantive opinion on a topic germane to personality assessment, including JPA articles, and (d) reviews of books, software, or tests.

### **Audience**

Clinical psychologists; forensic psychologists; personality, social, health, developmental, and educational psychologists; and other mental health professionals; sociologists, anthropologists, and specialists in family studies.

### **Instructions to Contributors**

#### **Manuscript preparation and Submission**

Manuscripts submitted to the Journal of Personality Assessment must present original material, must not have been published previously, and must not be under consideration for publication elsewhere. All listed authors should qualify for authorship by having made a substantial contribution to the conception, design, analysis, or interpretation of data and to writing or revising the manuscript.

Manuscripts are to be typewritten, double-spaced throughout, and prepared according to the Publication Manual of the American Psychological Association (5<sup>th</sup> ed.; [www.apastyle.org](http://www.apastyle.org)). In addition to the publication manual, authors of research manuscripts should incorporate the recommendations found in "Statistical methods in psychology journals: Guidelines and explanations" by Wilkinson and the APA Taskforce on Statistical Inference (1999, *American Psychologist*, 54, 594-604). JPA now requires authors to report the results of their statistical analyses using standard effect size measures (e.g. Cohen's *d*) in addition to traditional indices of statistical significance. Additionally, when reviewing and reporting the results of previous studies, authors are encouraged to generate and report effect sizes for these findings. Knowing the magnitude of prior findings makes it easier for new research to estimate statistical power and craft hypotheses that build on and incrementally extend the earlier findings.

Abstracts should be no more than 120 words. If the manuscript or parts of it have been previously presented at a conference, the Author Note should provide the name, location and date of meeting. All case reports must protect patient anonymity by avoiding or disguising information that could potentially identify the patient.

Manuscripts should be prepared for blind review at the time they are submitted. Thus, Author Notes should appear on the title page of the manuscript, which will be removed prior to review, and author identity should not be revealed intentionally in other ways. Authors should provide their postal address, phone number, e-mail address, and fax number. They will be notified when their paper is received and will be given a manuscript number that should be used in future correspondence.

Send submissions to Gregory J. Meyer, Ph.D., Journal of Personality Assessment, Department of Psychology, University of Alaska Anchorage, 3211 Providence Drive, Anchorage, AK USA 99508

Submissions should include one printed copy of the manuscript, as well as a 3.5 inch computer disk in an IBM compatible format. The disk should contain an electronic copy of the manuscript, the cover letter, and any additional correspondence. Electronic files should be in Microsoft Word, Corel WordPerfect, or Rich Text format. Tables may be submitted in Adobe Acrobat Portable Document Format (PDF) to preserve their layout and figures may also be in JPEG format. Disk notation should specify the file name(s) and word processing software used during preparation. After removing identifying information, the electronic file(s) will be used to expedite the peer review.

The editors reserve the right to refuse manuscripts and to make minor deletions and condensations. Authors are responsible for reviewing page proofs, correcting errors, answering Production Editor's queries, and promptly returning the proofs. Reprints may be ordered at the time page proofs are returned.



Notes for Authors

**Journal of Interpersonal Violence**

**Concerned with the Study and Treatment of Victims and Perpetrators of  
Physical and Sexual Violence**

**Editor**

**Jon R. Conte** University of Washington, USA

The Journal of Interpersonal Violence is devoted to the study and treatment of victims and perpetrators of interpersonal violence. It provides a forum for discussion of the concerns and activities of professionals and researchers working in domestic violence, child sexual abuse, rape and sexual assault, physical child abuse, and violent crime. With its dual focus on victims and victimizers, the journal will publish material that addresses the causes, effects, treatment, and prevention of all types of violence.

Manuscripts should be submitted in triplicate to Jon R. Conte, Editor, JOURNAL OF INTERPERSONAL VIOLENCE, School of Social Work JH-30, University of Washington, 4101 15<sup>th</sup> Avenue NE, Seattle, WA 98195.

Manuscripts should not exceed 22 typed double spaced pages, including references, tables and figures. References must conform to the Publication Manual of the American Psychological Association (Fourth Edition). All artwork must be camera ready. Authors should include their name, affiliation, mailing address, and telephone number. Each manuscript should include an abstract and biographical statement. A copy of the final revised manuscript saved on an IBM-compatible disk should be included with the final revised hard copy.

Submission of a manuscript implies commitment to publish in the journal. Authors submitting manuscripts to the journal should not simultaneously submit them to another journal, nor should manuscripts have been published elsewhere in substantially similar form or with substantially similar content. Authors in doubt about what constitutes prior publication should consult the editor.

## **Appendix C - Questionnaire Booklets**

- Information sheet**
- Demographic questionnaire**
- Dickman Impulsiveness Inventory**
- Barratt Impulsiveness Scale**
- Adult Impulsiveness Scale**
- BIS / BAS Scales**

## **Research into Impulsivity and Risk-taking behaviour**

I am currently undertaking research to complete my Doctorate in Clinical Psychology. This research is concerned with the central concept of impulsivity and the methods that Psychologists have devised to quantify impulsivity through the use of self-report questionnaires.

As such, I need your help to complete a number of questionnaires, contained in a booklet attached to this letter. Each of the questionnaires assesses aspects of impulsivity drawn from different theoretical models.

In total, the booklet contains five questionnaires, each varying in length. Together, the questionnaires should take no longer than half an hour. Each questionnaire in this booklet contains a number of items and has brief instructions at the top of the page. Some of the questionnaires require you to respond to a scale, whilst some require you to respond to 'true-false' questions.

In addition to completing the booklet I would also ask you to fill out some basic demographic information about yourself.

Thank you very much for your time. Your help is greatly appreciated.

Emily Miller  
Trainee Clinical Psychologist  
Doctoral Programme in Clinical Psychology  
Universities of Coventry and Warwick.

Research Supervisor  
Dr Jeremy Tudway  
Consultant Clinical & Forensic Psychologist  
Doctoral Programme in Clinical Psychology  
Universities of Coventry and Warwick.





## **Self Description Inventory – Dickman; 1990**

**Please read the statements below and tick the box which you feel most applies to you.**

		<b>True</b>	<b>False</b>
1.	I would travel a great deal if I had the chance.		
2.	I don't like to make decisions quickly, even simple decisions, such as choosing what to wear, or what to have for dinner.		
3.	I seldom tell lies.		
4.	I will often say whatever comes into my head without thinking first.		
5.	I have many hobbies.		
6.	I am good at taking advantage of unexpected opportunities, where you have to do something immediately or lose your chance.		
7.	I would rather read fiction than non-fiction.		
8.	I enjoy working out problems slowly and carefully.		
9.	I would not drive over the speed limit even if I knew I would not be caught.		
10.	I am uncomfortable when I have to make up my mind rapidly.		
11.	I consider myself a sympathetic person.		
12.	I frequently make appointments without thinking about whether I will be able to keep them.		
13.	I enjoy exercising.		
14.	I like to take part in really fast-paced conversations, where you don't have much time to think before you speak.		
15.	I like most of the people I meet.		
16.	I frequently buy things without thinking about whether or not I can really afford them.		
17.	I watch television about as much as most people do.		
18.	Most of the time, I can put my thoughts into words very rapidly.		
19.	I enjoy outdoor activities.		
20.	I often make up my mind without taking the time to consider the situation from all angles.		
21.	I have read more books than most of my friends.		
22.	I don't like to do things quickly, even when I am doing something that is not very difficult.		
23.	I am more alert than most people late at night.		
24.	Often, I don't spend enough time thinking over a situation before I act.		
25.	I like to read about scientific research.		
26.	I would enjoy working at a job that required me to make a lot of split-second decisions.		
27.	Religion is very important in my life.		
28.	I often get into trouble because I don't think before I act.		
29.	I have more curiosity than most people.		
30.	I like sports and games in which you have to choose your next move very quickly.		
31.	I read the newspaper almost every day.		
32.	Many times the plans I make don't work out because I haven't gone over them carefully enough in advance.		
33.	I sometimes get depressed for no good reason.		

		True	False
34.	People have admired me because I can think quickly.		
35.	I enjoy it when I get a chance to visit a city I've never seen before.		
36.	I rarely get involved in projects without first considering the potential problems.		
37.	I am easily embarrassed.		
38.	I have often missed out on opportunities because I couldn't make my mind up fast enough.		
39.	I am more alert than most people in the morning.		
40.	Before making any important decisions, I carefully weigh the pros and cons.		
41.	I make an effort to take care of my health.		
42.	I try to avoid activities where you have to act without much time to think first.		
43.	I generally go to bed at a later hour than most people do.		
44.	I am good at careful reasoning.		
45.	I think that I am more creative than most of my friends.		
46.	I often say and do things without considering the consequences.		



**Barratt Impulsiveness Scale (BIS-11)**  
**Patton et al., 1995**

Please read each statement carefully and tick the box which you feel most applies to you.

		Rarely/ Never	Occasionally	Often	Almost Always
1.	I plan tasks carefully.				
2.	I do things without thinking				
3.	I make up my mind quickly				
4.	I am happy-go-lucky				
5.	I don't pay attention				
6.	I have racing thoughts				
7.	I plan trips well ahead of time				
8.	I am self-controlled				
9.	I concentrate easily				
10.	I save regularly				
11.	I squirm at plays or lectures				
12.	I am a careful thinker				
13.	I plan for job security				
14.	I say things without thinking				
15.	I like to think about complex problems				
16.	I change jobs				
17.	I act on impulse				
18.	I get easily bored when solving thought problems				
19.	I act on the spur of the moment				
20.	I am a steady thinker				
21.	I change where I live				
22.	I buy things on impulse				
23.	I can only think about one problem at a time				
24.	I change hobbies				
25.	I spend more than I earn				
26.	I have outside thoughts when thinking				
27.	I am more interested in the present than the future				
28.	I am restless at lectures or talks				
29.	I like puzzles				
30.	I plan for the future				

## **Adult Impulsiveness Scale – Eysenck, Easting, Pearson & Allsop, 1984**

**Please answer each question by putting a circle around the ‘YES’ or ‘NO’ following the question.**

1.	Would you enjoy water skiing?	YES	NO
2.	Usually do you prefer to stick to brands you know are reliable, to trying new ones on the chance of finding something better?	YES	NO
3.	Would you feel sorry for a lonely stranger?	YES	NO
4.	Do you quite enjoy taking risks?	YES	NO
5.	Do you often get emotionally involved with your friends' problems?	YES	NO
6.	Would you enjoy parachute jumping?	YES	NO
7.	Do you often buy things on impulse?	YES	NO
8.	Do unhappy people who are sorry for themselves irritate you?	YES	NO
9.	Do you generally do and say things without stopping to think?	YES	NO
10.	Are you inclined to get nervous when others around you seem to be nervous?	YES	NO
11.	Do you often get into a jam because you do things without thinking?	YES	NO
12.	Do you think hitchhiking is too dangerous a way to travel?	YES	NO
13.	Do you find it silly for people to cry out of happiness?	YES	NO
14.	Do you like diving off the high board?	YES	NO
15.	Do people you are with have a strong influence on your moods?	YES	NO
16.	Are you an impulsive person?	YES	NO
17.	Do you welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional?	YES	NO
18.	Does it affect you very much when one of your friends seems upset?	YES	NO
19.	Do you usually think carefully before doing anything?	YES	NO
20.	Would you like to learn to fly an aeroplane?	YES	NO
21.	Do you ever get deeply involved with the feelings of a character in a film, play or novel?	YES	NO
22.	Do you often do things on the spur of the moment?	YES	NO
23.	Do you get very upset when you see someone cry?	YES	NO
24.	Do you sometimes find else's laughter catching?	YES	NO
25.	Do you mostly speak without thinking things out?	YES	NO
26.	Do you often get involved in things you later wish you could get out of?	YES	NO
27.	Do you get so carried away by new and exciting ideas, that you never think of possible snags?	YES	NO
28.	Do you find it hard to understand people who risk their necks climbing mountains?	YES	NO
29.	Can you make decisions without worrying about other peoples' feelings?	YES	NO
30.	Do you sometimes like doing things that are a bit frightening?	YES	NO
31.	Do you need to use a lot of self-control to keep out of trouble?	YES	NO
32.	Do you become more irritated than sympathetic when you see someone cry?	YES	NO
33.	Would you agree that almost everything enjoyable is illegal or immoral?	YES	NO
34.	Generally do you prefer to enter cold sea water gradually, to diving or jumping straight in?	YES	NO



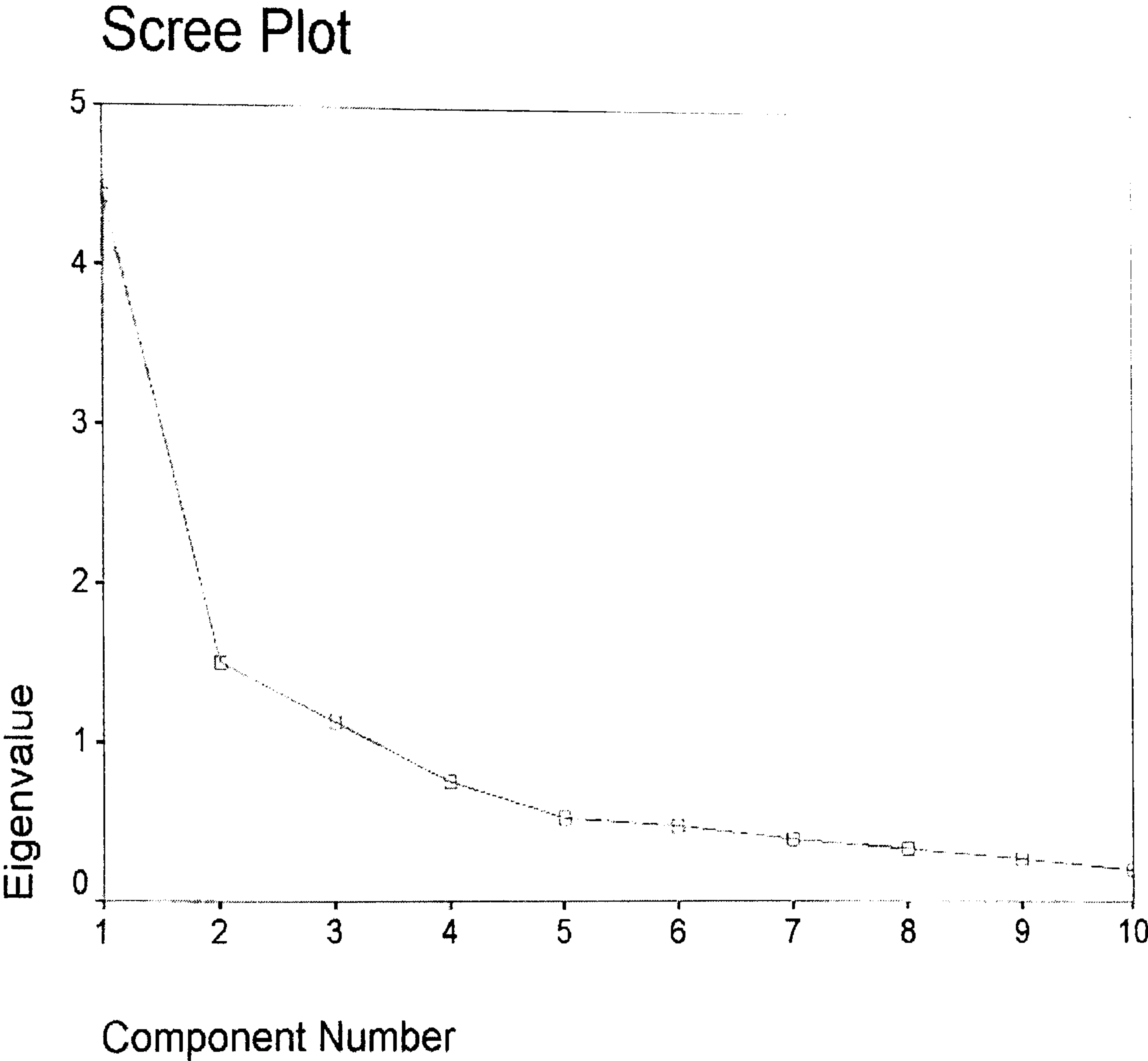
35.	Are you often surprised at people's reactions to what you say or do?	<b>YES</b>	<b>NO</b>
36.	Would you enjoy the sensation of skiing very fast down a high mountain slope?	<b>YES</b>	<b>NO</b>
37.	Do you like watching people open presents?	<b>YES</b>	<b>NO</b>
38.	Do you think an evening out is more successful if it is unplanned or arranged at the last moment?	<b>YES</b>	<b>NO</b>
39.	Would you like to go scuba diving?	<b>YES</b>	<b>NO</b>
40.	Would you find it hard to break bad news to someone?	<b>YES</b>	<b>NO</b>
41.	Would you enjoy fast driving?	<b>YES</b>	<b>NO</b>
42.	Do you usually work quickly, without bothering to check?	<b>YES</b>	<b>NO</b>
43.	Do you often change your interests?	<b>YES</b>	<b>NO</b>
44.	Before making up your mind, do you consider all the advantages and disadvantages?	<b>YES</b>	<b>NO</b>
45.	Can you get very interested in your friends' problems?	<b>YES</b>	<b>NO</b>
46.	Would you like to go pot-holing?	<b>YES</b>	<b>NO</b>
47.	Would you be put off a job involving quite a bit of danger?	<b>YES</b>	<b>NO</b>
48.	Do you prefer to sleep on it before making decisions?	<b>YES</b>	<b>NO</b>
49.	When people shout at you, do you shout back?	<b>YES</b>	<b>NO</b>
50.	Do you feel sorry for very shy people?	<b>YES</b>	<b>NO</b>
51.	Are you happy when you are with a cheerful group and sad when the others are glum?	<b>YES</b>	<b>NO</b>
52.	Do you usually make up your mind quickly?	<b>YES</b>	<b>NO</b>
53.	Can you imagine what it must be like to be lonely?	<b>YES</b>	<b>NO</b>
54.	Does it worry you when others are worrying and panicky?	<b>YES</b>	<b>NO</b>



## **BIS / BAS Scales – Carver & White; 1994**

**Please read the statements below and tick the box which you feel applies to you.**

		Very True	Somewhat True	Somewhat False	Very False
1.	A person's family is the most important thing in life.				
2.	Even if something bad is about to happen to me, I rarely experience fear or nervousness.				
3.	I go out of my way to get things I want.				
4.	When I am doing well at something I love to keep at it.				
5.	I am always willing to try something new if I think it will be fun.				
6.	How I dress is important to me.				
7.	When I get something I want, I feel excited and energized.				
8.	Criticism or scolding hurts me quite a bit.				
9.	When I want something, I usually go all out to get it.				
10.	I will often do things for no other reason than that they might be fun.				
11.	It's hard for me to find the time to do things such as get a haircut.				
12.	If I see a chance to get something I want, I move on it right away.				
13.	I feel pretty worried or upset when I think or know somebody is angry with me.				
14.	When I see an opportunity for something I like, I get excited right away.				
15.	I often act on the spur of the moment.				
16.	If I think something unpleasant is going to happen I usually get pretty 'worked up'.				
17.	I often wonder why people act the way they do.				
18.	When good things happen to me, it affects me strongly.				
19.	I feel worried when I think I have done poorly at something important.				
20.	I crave excitement and new sensations.				
21.	When I go after something, I use a 'no holds barred' approach.				
22.	I have very few fears compared to my friends.				
23.	It would excite me to win a contest.				
24.	I worry about making mistakes.				







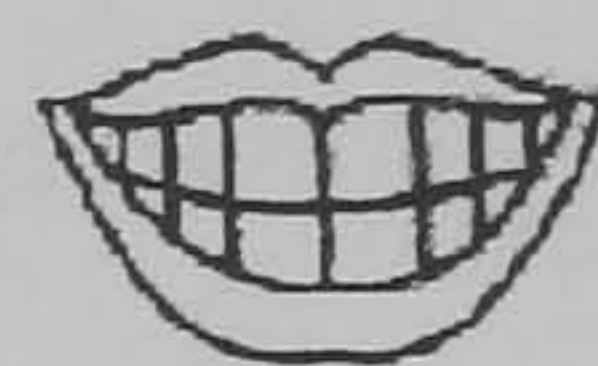
1.pcx



10.pcx



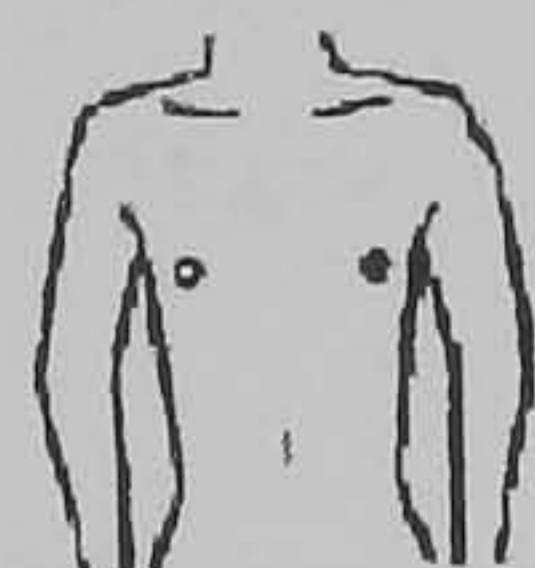
2.pcx



3.pcx



4.pcx



5.pcx



6.pcx



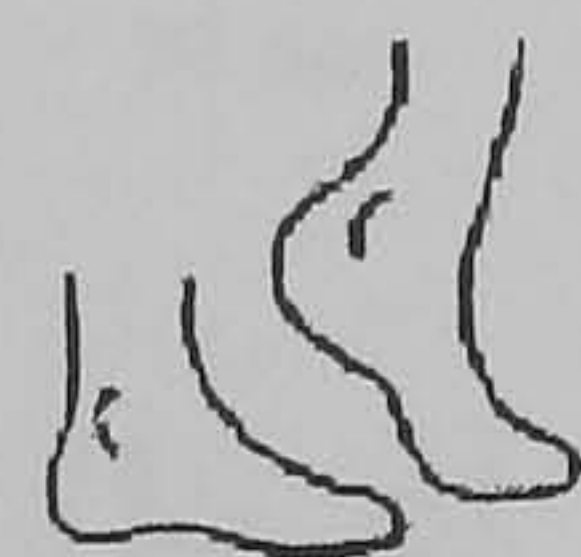
7.pcx



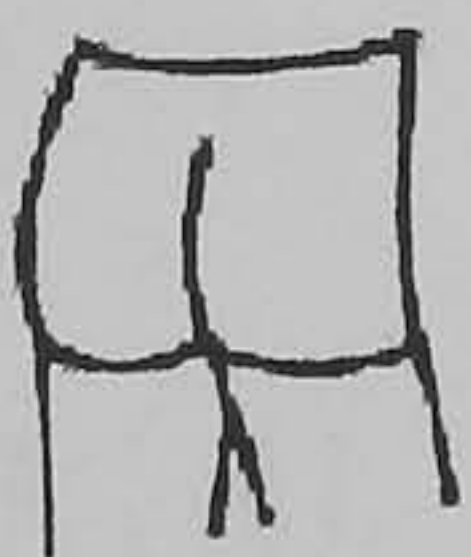
8.pcx



9.pcx



11.pcx



12.pcx



13.pcx



14.pcx



15.pcx



16.pcx



17.pcx



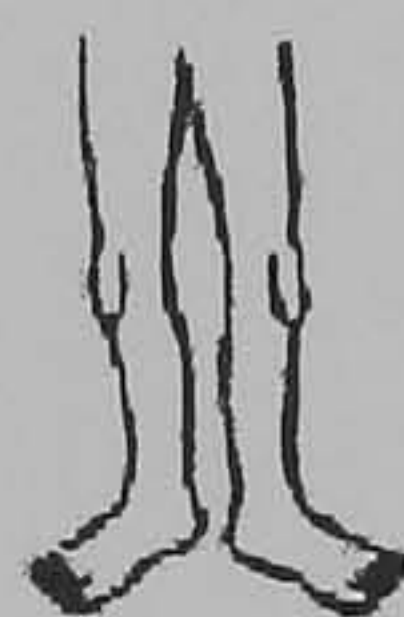
18.pcx



19.pcx



20.pcx



21.pcx



22.pcx



23.pcx



24.pcx



25.pcx



26.pcx



27.pcx



28.pcx



29.pcx



30.pcx





31.pcx



32.pcx



33.pcx



34.pcx



35.pcx



36.pcx



37.pcx



38.pcx



39.pcx



40.pcx



41.pcx



42.pcx



43.pcx



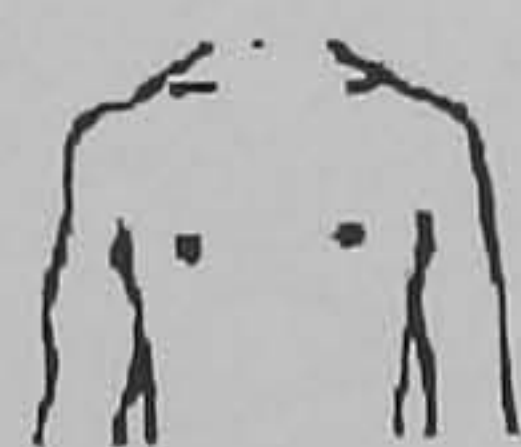
44.pcx



45.pcx



46.pcx



47.pcx



48.pcx

## APPENDIX F

Output generated by VS02  
Press any key to start was the start message  
End of block was the end message  
255 BG palette number  
0 FG palette number  
4 X cells  
  
4 Y cells  
120 X spacing  
120 Y spacing  
10 noise level  
Y random order Y/N  
50 inter-trial interval  
6853 1 10 f 1 28 1 2 3 4 5 6 7 8 9 28  
1923 1 4 d 1 1 1 7 8 25  
3356 0 8 k 1 14 3 5 7 9 20 21 22 27  
2899 1 6 d 1 19 1 2 8 18 19 25  
Output generated by VS02  
Press any key to start was the start message  
End of block was the end message  
255 BG palette number  
0 FG palette number  
4 X cells  
4 Y cells  
120 X spacing  
120 Y spacing  
10 noise level  
Y random order Y/N  
50 inter-trial interval  
2716 1 8 s 2 20 1 2 4 5 13 20 23 26  
2268 0 6 k 2 19 1 7 13 20 28 29  
1357 1 4 w 2 4 4 9 11 20  
3824 0 10 k 2 8 1 3 7 11 13 14 19 21 24 28  
2272 0 10 k 2 5 1 6 7 8 11 13 14 19 20 24  
2490 0 8 k 2 25 2 3 5 6 22 27 28 29  
5425 0 8 k 2 14 1 3 7 13 15 19 23 28  
3082 0 10 k 2 22 2 3 6 9 10 18 24 25 27 29  
2437 1 6 s 2 29 1 6 8 25 28 29  
2302 1 8 s 2 21 1 7 8 11 13 14 19 21  
1900 1 6 s 2 10 3 7 9 10 22 26  
1955 1 10 s 2 7 1 3 7 8 11 18 19 22 25 29  
1343 1 4 d 2 18 2 10 18 19  
1479 0 4 k 2 3 5 6 7 8  
2592 0 6 i 2 13 8 11 19 20 21 25  
1408 1 4 s 2 1 1 2 3 4  
Output generated by VS02  
Press any key to start was the start message  
End of block was the end message  
255 BG palette number  
0 FG palette number  
4 X cells  
4 Y cells  
120 X spacing  
120 Y spacing  
10 noise level  
Y random order Y/N  
50 inter-trial interval  
4845 0 10 k 3 45 33 34 35 36 38 43 44 46 47 48  
1928 1 4 s 3 47 41 44 47 48  
4026 1 10 k 3 42 31 33 36 37 38 39 40 42 45 46



```

1579 1 6 d 3 34 34 35 38 46 47 48
2549 1 4 k 3 36 31 35 36 43
2713 0 6 l 3 30 34 35 36 37 38 39
7546 1 8 d 3 44 30 33 34 35 38 43 44 47
2850 0 6 k 3 33 37 40 41 42 44 45
2716 0 8 , 3 35 34 36 37 39 42 45 46 47
2628 0 8 s 3 37 35 36 38 39 40 41 44 47
1689 0 4 i 3 46 32 36 37 45
4171 0 10 i 3 39 34 35 36 37 40 41 42 45 46 48
Output generated by VS02
Press any key to start was the start message
End of block was the end message
255 BG palette number
0 FG palette number
4 X cells
4 Y cells
120 X spacing
120 Y spacing
10 noise level
Y random order Y/N
50 inter-trial interval
1810 1 8 s 4 20 1 2 4 5 13 20 23 26
2803 0 10 , 4 22 2 3 6 9 10 18 24 25 27 29
2655 0 10 , 4 5 1 6 7 8 11 13 14 19 20 24
3315 0 10 m 4 8 1 3 7 11 13 14 19 21 24 28
1799 0 6 , 4 13 8 11 19 20 21 25
2155 1 4 s 4 1 1 2 3 4
1468 1 6 d 4 10 3 7 9 10 22 26
1434 1 10 s 4 7 1 3 7 8 11 18 19 22 25 29
2359 1 6 s 4 29 1 6 8 25 28 29
30000 0 8 ! 4 25 2 3 5 6 22 27 28 29
2603 0 8 k 4 14 1 3 7 13 15 19 23 28
1678 1 4 s 4 4 4 9 11 20
1979 0 6 , 4 19 1 7 13 20 28 29
1348 1 4 s 4 18 2 10 18 19
2682 1 8 s 4 21 1 7 8 11 13 14 19 21
1577 0 4 k 4 3 5 6 7 8

```



## APPENDIX G

Client number: \_\_\_\_\_

Date of testing: \_\_\_\_\_

### GSR Monitoring Sheet

<u>Practice Block</u>	GSR		GSR
Trial 1		Trial 3	
Trial 2		Trial 4	
<b><u>Block 1</u></b>			
Trial 1		Trial 9	
Trial 2		Trial 10	
Trial 3		Trial 11	
Trial 4		Trial 12	
Trial 5		Trial 13	
Trial 6		Trial 14	
Trial 7		Trial 15	
Trial 8		Trial 16	
<b><u>Block 2</u></b>			
Trial 1		Trial 7	
Trial 2		Trial 8	
Trial 3		Trial 9	
Trial 4		Trial 10	
Trial 5		Trial 11	
Trial 6		Trial 12	
<b><u>Block 3</u></b>			
Trial 1		Trial 9	
Trial 2		Trial 10	
Trial 3		Trial 11	
Trial 4		Trial 12	
Trial 5		Trial 13	
Trial 6		Trial 14	
Trial 7		Trial 15	
Trial 8		Trial 16	

Centre Number:  
Participant Identification Number:

**Title of study: Using a cognitive paradigm to test  
Dickman's Attentional-Fixity theory (Dickman; 1993, 1996)  
of impulsivity among a UK forensic population**

## **CONSENT FORM**

Name of Researcher: EMILY MILLER.

1. By writing my name at the bottom of this paper, it shows that:
  - a. I understand the information  
(dated...../version.....) for this study.
  - b. I have been able to ask any questions I had.
  - c. I have chosen to take part.
  - d. No-one has said that I have to take part.
2. I know that I can change my mind at any time and I can say I don't want to continue at any point.
  - a. This will not affect my treatment in any way
  - b. This will not influence my care in the hospital.
3. The results will only be used for this study and not in my treatment.
4. No-one will be know who I am by looking at the results.
5. If I want to I can have a copy of the results.

Researcher\_\_\_\_\_

Date \_\_\_\_\_

Participant \_\_\_\_\_

Date \_\_\_\_\_

**ADDRESS FORM**

Please send a summary of the results of the study to:

**Participant number :** \_\_\_\_\_

**Address:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ **Postcode** \_\_\_\_\_



## **INFORMATION ABOUT THE STUDY**

- **Who is doing the study?**

My Name is Emily Miller, I am a Trainee Clinical Psychologist with the Coventry and Warwick Universities. I will meet with you and do the tests with you.

Dr. Jeremy Tudway (Consultant Clinical Psychologist) works with me, and will also see the results of the tests we do. You will not meet him during this study. Dr Tudway works as a psychologist in Leicestershire.

- **What is the study about?**

The study is about how some people do things before thinking about them. Some people will always think about things before acting. Other people do things before they think about what might happen next. I am trying to find out if people that think about things before acting do better on this computer test.

- **What will you be asked to do?**

To the part in the study I will ask you to do four things:

1. Do a quick test which measures your intelligence
2. Answer some questions about doing things before you think.
3. Do a test on a computer, where you have to look at different body parts.
4. Wear two finger bands which measures your heart beat.

At any time during testing, it is OK for you to change your mind, and say you do not want to be tested.

### **What will happen to the results?**

Your results, with the other results I collect, will be kept safely in the computer. Only two people, myself and Dr Tudway can get into this computer, with a secret password. In the computer, there is no record of your name. Instead of your name, you are given a number. This means your results are totally confidential / private.

All of the results will be written in a psychology journal (like a magazine) which will say what I found from doing the study. No names (or numbers) will be written in this journal. No-one reading it, will know you took part in the study. Psychology journals are not sold in shops like newspapers, but are read by psychologists and other professionals, like doctors and nurses.

If you like, I will send you a copy of the results of the study.

Thank you for your time.

**Emily Miller**  
**Trainee Clinical Psychologist**

**Dr Jeremy Tudway**  
**Consultant Clinical Psychologist**

**17 March 2003**